Get Started with Tableau Server

We’ve updated our online help layout! For more information see Updated server online help layout.

Different types of users interact with Tableau Server in different ways. We’ve organized the documentation for our readers with an eye to what types of tasks different readers are probably interested in.

- **User Guide.** In this documentation, the User Guide is for business users—people who go to Tableau Server to see and interact with views. This guide is also useful for analysts/authors, or as we also refer to them, *content owners*—people who create workbooks and views and publish them.

- **Site Administrator Guide.** The Site Administrator Guide is for people who manage one or more individual sites on Tableau Server—they customize existing sites, add and manage users, manage permissions for users and content, and monitor site usage. Some of the information in this guide is also useful for analysts/authors, who create workbooks and views and publish them (content owners), and for *data stewards*, who create, manage, and publish data sources.

- **Server Administrator Guide.** The Server Administrator Guide is for people who install, configure, and manage Tableau Server itself. Tasks for the server administrator include installing and upgrading the server, managing licensing, backing up the server, adding and managing nodes in a cluster, managing security and authentication (including SSL).

**Suggested starting points**

The following lists provide suggested starting points and topics of interest in the documentation for each type of user.
Users

- Welcome to the Tableau Server User Guide
- Sign in to Tableau Server
- Explore Content

Content owners, data stewards, and publishers

- Content Access and Ownership
- Keep Content Revisions
- Refresh Data on a Schedule

Site administrators

- Navigate Site Admin Pages
- Planning a Site
- Content Access and Ownership
- Refresh Data on a Schedule

Server administrators

If you’re new to being a server administrator, if you’re installing a trial version of Tableau Server, or if you’re an IT pro who wants a high-level overview of the how to install and configure Tableau Server, start here:

- Everybody’s Install Guide

This guide walks you through the basic planning and installation tasks for a single-server installation of Tableau Server.

If you are comfortable as a server administrator and if you want more in-depth information about installing and configuring Tableau Server, we recommend the Server Administrator Guide, which provides comprehensive information about how to install, manage, and monitor Tableau Server.

- Before You Install
- Navigate Server Admin Pages
- Distributed Environments
- Security
Get information on using Tableau Server

For information on using Tableau Server, click the help menu at the top of the page.

Product version information

To find your Tableau Server version and build number, click About Tableau Server.

Your version and build number appear in the About Tableau Server dialog box:
Welcome to Tableau Server

Tableau Server, by Tableau Software®, is an online solution for sharing, distributing, and collaborating on content created in Tableau.

- **Shareable.** Create workbooks and views, dashboards, and data sources in Tableau Desktop, and then publish this content to the server.

- **Secure.** Manage access to published content to help protect sensitive data. Administrators can set user permissions on projects, workbooks, views, and data sources.

- **Mobile.** See and interact with the most up-to-date server content from anywhere, in a browser or the Tableau Mobile app.

New to Tableau Server? Go to Get Started with Tableau Server to learn more.

A Tableau Server content page, where users can explore and interact with up-to-date data.
What’s New in Tableau Server

What's New in Version 10.2

The following features and enhancements are new in Tableau Server 10.2:

**Server administrator**

- HTTP header security enhancements
- Guest access per site
- Encrypted secrets storage
- OpenID Connect improvements
- Trusted authentication improvements
- SSL support for password-protected key file
- Support for SAP BW Single Sign-On
- Support for Windows Server 2016

**User**

- Support for WCAG-Conformant views on the web
- Web authoring enhancements
- Legends per measure

**HTTP header security enhancements**

The following HTTP header security enhancements are included in Tableau Server 10.2.2:
• HTTP Strict Transport Security (HSTS) header: The HSTS header forces browsers to use HTTPS on the domain where it is enabled. While HSTS is now included with Tableau Server, it is not enabled by default. We recommend that you enable HSTS. See 14. Enable HTTP Strict Transport Security for web browser clients.

• X-Content-Type-Options response HTTP header: This header specifies that the MIME type in the Content-Type header should not be changed by the browser. In some cases, where MIME type is not specified, a browser may attempt to determine the MIME type by evaluating the characteristics of the payload. The browser will then display the content accordingly. This process is referred to as "sniffing." Misinterpreting the MIME type can lead to security vulnerabilities. The X-Content-Type-Options HTTP header is now set to 'nosniff' by default. To disable "nosniff", see the gateway.http.x_content_type_nosniff option at tabadmin set options.

• HTTP X-XSS-Protection response header: This header is sent to the browser to enable cross-site scripting (XSS) protection. The X-XSS-Protection response header overrides configurations in cases where users have disabled XSS protection in the browser. The X-XSS-Protection response header is now enabled by default. To disable this header, see the gateway.http.x_xss_protection option at tabadmin set options.

Guest access per site

With core-based licenses, a server administrator can control Guest access per site. Guest access allows people to interact with embedded views without having to sign in.

You allow or disallow Guest access on the server Settings page. For more information, see Guest User.

Encrypted secrets storage

Tableau Server needs to store a number of secrets it uses to perform various functions, typically securing internal communication, communicating with other applications or the operating system, or providing secure communication with clients.
Beginning with Tableau Server 10.2, most secrets are encrypted while at rest. See Manage Server Secrets.

OpenID Connect improvements

OpenID Connect (OIDC) support has been enhanced in this release to improve authentication scenarios with custom OIDC identity providers (IdP). Improvements include support for:

- Custom IdP claim mapping
- Ignoring JSON Web Token (JWT) validation
- Referencing static (local file) discovery document

See OpenID Connect.

Trusted authentication improvements

As of version 10.2, we've improved how Tableau Server stores trusted tickets in the Tableau Server repository. This change ensures that any trusted ticket content stored on Tableau Server cannot be used to impersonate users or access content protected by authentication. See How Trusted Authentication Works.

SSL support for password-protected key file

As of version 10.2, we've added support for organizations that use password-protected SSL keys. See Configure External SSL.

Support for SAP BW Single Sign-On

You can configure single sign-on (SSO) support from Tableau to SAP NetWeaver Business Warehouse (SAP BW). See Enable Single Sign-On for SAP BW.
Support for Windows Server 2016

You can install Tableau Server on Windows Server 2016. For more information about supported operating systems, see Before you install....

Support for WCAG-Conformant views on the web

Embedded views that you author in Tableau Desktop, publish to Tableau Server, and embed in WCAG-conformant web pages, now meet WCAG 2.0 AA conformance and section 508 standards.

Views that are made available to users in Tableau Desktop, Tableau Reader, or Tableau Public are not yet supported for WCAG conformance. Views created or edited on the web in Tableau Server are not yet supported for WCAG conformance.

The following parts of the embedded view are WCAG-conformant:

- Sheet tabs
- The view area of the sheet
- Titles and captions
- Categorical legends
- Single Value (list) filters, which are radio buttons, and Multiple Values (list) filters, which are check boxes.
- The View Data window

Some aspects of the Tableau interface are not yet supported, such as other filter types, parameters, and the view toolbar. Using these controls in your visualizations might make it difficult for users who use assistive technologies to fully understand your views.

Keyboard navigation, programmatic context for assistive technologies (using ARIA roles), alternative text for non-text elements and contrast standards, and authentication when signing into Tableau Server are also supported for embedded views.
For more information about creating accessible views, see Best Practices for Building WCAG-Conformant Views and Author Views for Accessibility in Tableau Desktop help.

Web authoring enhancements

Enhancements to web editing in Tableau 10.2 include the following.

Web edit menu bar

A menu bar is now available as you edit views on the web.

The Analysis menu includes the following new functionality for web editing:

- **Analysis > Aggregate Measures** - Use this command to aggregate or disaggregate data in the view. Tableau typically aggregates measures in your view, which means that it collects individual row values from your data source into a single value (which becomes a single mark) adjusted to the level of detail in your view. Disaggregating data means that Tableau will display a separate mark for every row data value in your data source. For more information, see Disaggregating Data in the Tableau Desktop online help.

- **Analysis > Stack Marks** - Stacking marks is relevant when your data view includes numeric axes. That is, at least one measure has been placed on the Rows or Columns shelves. When marks are stacked, they are drawn cumulatively along an axis. When marks are not stacked, they are drawn independently along an axis. That is, they are overlapping. For more information, see Stack Marks in the Tableau Desktop online help.

Reference distributions

In addition to reference lines and bands, you can now create and configure reference distributions on a continuous axis. For details, see Add Reference Lines, Bands and
Distributions.

Sort data in the view

To quickly sort data in your view, click the Sort buttons on the toolbar, and in the view. You can sort in ascending, or descending order.

Select a background map

If you’re editing a map view on Tableau Server, you can now select a background map.

To select a background map, select **Map > Background Maps**.

You can select the Tableau background map, or a WMS server or Mapbox map that the workbook author included with the workbook. You can also select **None** to remove a background map.

For more information, see Select Background Maps in the Tableau Desktop Help.

Legends per measure

When you include **Measure Names** and **Measure Values** in your view and drag **Measure Values** to color, you now have the option to create separate color legends for each measure in your view.

In the example below, in Edit mode, when you drag **Measure Values** to color in the view, by default, Tableau creates a single color legend that applies to all measures in the view.
To create separate color legends for each measure in the view, click the drop-down arrow on the Measure Values field in the Marks card and select Use Separate Legends in the context menu, Tableau creates a color legend for each measure in the view.

**Note:** Tableau assigns the default color palette to each new color legend. Editing the color palette for each new legend is not available for web authoring in version 10.2. If you want to use unique color palettes for each color legend, you can create the view in Tableau Desktop, edit the color palette for each legend and then publish the view to Tableau Server.
To recombine the legends, simply click on the drop-down arrow on the Measure Values field on the Marks card and select Combine Legends.

For more information about how to create separate legends for measures, see Legends in the Tableau Desktop Help.

Resize axes

You can now resize an axis in the view. To resize an axis, hover your cursor over it in the view until you see the double-sided arrow, and then click and drag the axis.
Assign colors to data items

For categorical fields, you can assign specific colors and custom colors (using hex code) to data items. To assign a custom color to a data item, double-click the color representing the data item, and then type the hex code for the color.
Add web page objects to dashboards

In addition to adding views to your dashboards, you can add objects, including horizontal and vertical layout containers, blank space—and now, web page objects. A web page object lets you add web-based information to your dashboard.
The result is a web page, embedded in your dashboard. For more details, see Create a Dashboard.

Set a dashboard item's exact size and position

The settings on the Layout tab give you a high degree of control over the size and position of every item in a dashboard. To set a dashboard item's position, use the x and y settings, where a position of 0 (such as x = 0 and y = 0) is the top left corner of the dashboard. Use the w and h settings to control width and height.

For more information, see Resize and Lay Out Your Dashboard.

Added in Version 10.1

The following features and enhancements are new in Tableau Server 10.1:

**User**

- Web authoring enhancements
- Full-screen views
• Send subscriptions for high-priority alerts

• See user images, plus content counts in quick-search

**Server administrator**

• Automate Tableau Server install

• Let users reset passwords for local-authentication servers

**Help improvements**

• Updated server online help layout

**Web authoring enhancements**

Web authoring now supports the following capabilities:

• Show or hide headers in a view

• Add reference lines and bands to a continuous axis in a view. See Add Reference Lines, Bands and Distributions.

• View read-only device layouts for dashboards

**Full-screen views**

To expand a view, click **Full Screen** at the far right of the toolbar. To return to the view to its previous size, press Esc.

![Original View, Edit, Share, Download, Full Screen buttons](image)

The Full Screen button appears in embedded views too. For more information, see Share Views.

**Send subscriptions for high-priority alerts**

If you've configured a view to contain data only when high-priority information exists, select the new subscription option, **Don't send if view is empty**. For more information, see...
Subscribe to Views and Manage Your Subscription Settings.

See user images, plus content counts in quick-search

If your organization uses Active Directory, user images automatically appear in Tableau Server. (If you update your profile image, ask a Tableau administrator to re-import your user account. For more information, see Add Users to a Site.)

Quick-search shows user images too, along with counts of workbooks, views, and data sources users own. For more information, see Search Content.

![User Image Example]

Automate Tableau Server install

Server administrators can now fully automate installation or upgrade of Tableau Server. Use the example python script on GitHub as a starting point for creating your own automated installation or upgrade. For more information, see Automated Installation or Upgrade of Tableau Server.

Let users reset passwords for local-authentication servers

Previously, if Tableau Server used local authentication, only administrators could reset passwords. Now users can reset their own passwords by clicking "Forgot password" on the sign-in page. To enable this, set the `features.PasswordReset` tabadmin option to `true`. For more information, see `tabadmin set options`.

Updated server online help layout

We’ve updated our server help!
We hope you find this format more useful than our previous versions. The most visible change is that we’ve moved the navigation to the top of the page. We’ve reorganized the help according to roles (User, Site, and Server) so you can navigate through the content that is useful for you and the tasks you need to complete. See Get Started with Tableau Server to learn more about these roles and how we’ve organized our content.

The new format provides other improvements that are not as visible. As Tableau data nerds, we noticed that 70% of the traffic entering the Help site comes from Google. But the old content experience sent all that Google traffic to navigation-free versions of Help pages that often looked like dead-ends. Now, folks coming from Google see Writing Embed Code. This new nav structure has also motivated us to help Google users in other ways, such as combining content in longer articles to make it more likely that the first page people hit contains information relevant to them.

Tableau is also embracing mobile workflows, and this new Help layout provides a far better experience on mobile devices. The search box appears right up top rather than nested in a menu, the navigation menu requires fewer clicks, and the text is easier to read on a small screen.

We’ll continue to make more improvements in future releases. Got feedback or ideas on how to make our content better? We want it. Please use the blue feedback bar on the top of any page (Was this page helpful?) to open the comment field and submit your feedback.

Added in Version 10.0

The following features and enhancements are new in Tableau Server 10.0:

User

- Revision history for data sources and workbooks
- Enhancements for data source discovery
10.0 web authoring enhancements

Site administrator

- Site-specific SAML

Server administrator

- Administrative views for Tableau Desktop license reporting
- Administrative views for Tableau Server performance
- Subscribe other users to views and workbooks
- Customize server logos independently
- Cluster deployment
- Performance improvements
- Kerberos enhancements
- Updated server menus and navigation

Updated server menus and navigation

Top-level menus in Tableau Server have changed. For example, users who are signed in as server administrators now access individual sites by using the Manage All Sites menu.

Revision history for data sources and workbooks

As with revision history for workbooks (added in version 9.3), Tableau Server now supports revision history for data sources. Every time you publish a data source, Tableau can save a version of that data source to its revision history. In addition, workbook revisions can now be restored online in Tableau Server. For more information, see Work with Content Revisions and Enable Users to Save Revision History.
Enhancements for data source discovery

Published data sources can be marked as favorites, which means you can now filter and view favorite data sources.

On the Data Sources page, you can now sort data sources based on popularity—number of connected workbooks, page views based on the number of page views for workbooks, and views that are using a data source.

10.0 web authoring enhancements

In version 10.0, web authoring supports creating dashboards online, connecting to published data sources, cross-data filtering, data blending, and more.

- Create and edit dashboards
- Filter across data sources
- Blend data sources
- Rename fields
- Workbook formatting
- Data highlighting
- Show and hide cards for captions, filters, and highlighters
- Clear or duplicate sheets (for views or dashboards)
- Full support for creating and editing table calculations

Subscribe other users to views and workbooks

Content owners, project leaders, and administrators can now subscribe other users to workbooks and views in Tableau Server. For more information, see Set Up Subscriptions and Subscribe to Views.
Performance improvements

Tableau Server includes the following performance improvements to reduce load times and provide faster feedback after some workbook edits:

- To display views more quickly, the initial page load time for views has been improved.
- To display story points more quickly and provide a better experience when you navigate between them, Tableau Server now caches and pre-fetches story points.
- To provide faster feedback when you edit workbooks, the changes that you make to colors, shapes, and global transparency display more quickly.

Administrative views for Tableau Server performance

You can use two new administrative views to help optimize background tasks and view load times. The Performance of Views administrative view displays how long it takes for views to load and how many sessions are running at a time on the server. The Background Task Delay view displays how long extract refresh tasks and subscription tasks are delayed—that is, the amount of time between when they are scheduled to run and when they actually run. For more information, see Background Task Delay and Performance of Views.

Customize server logos independently

You can now specify custom images for the main header, sign-in, and web authoring logos. For more information, see Change the Name or Logo and customize.

Administrative views for Tableau Desktop license reporting

Two new administrative views provide visibility into how Tableau Desktop licenses are being used in your organization, including which licenses are due for maintenance renewal or upgrade from trial versions. For more information, see Configure Desktop License Reporting.
Note: Desktop License Reporting is disabled on Tableau Server by default. See Enable and configure Desktop license reporting for details on how to enable it.

Cluster deployment

Cluster installations no longer require Active Directory domain deployment. You can now install a cluster in a Windows Workgroup. See Distributed Requirements for more information.

Site-specific SAML

Tableau Server now includes more options for authenticating users with SAML. For a Tableau Server installation with multiple sites, you can configure each site to use a separate SAML identity provider (IdP). For more information, see SAML.

Kerberos enhancements

Tableau Server now includes the following enhancements to Kerberos support:

- Kerberos authentication for Oracle data sources. See Enable Kerberos for Oracle.
- Multi-domain support for Kerberos delegation. See Kerberos delegation multi-domain configuration.
- The ability to use JDBC to connect to SAP HANA on a Mac. You can now connect to SAP HANA on a Mac using JDBC drivers and Kerberos authentication. For more information, see SAP HANA.

Added in Version 9.3

The following features and enhancements are new in Tableau Server 9.3:
• Revision history for workbooks

• Support for manual-only repository failover

• PostgreSQL database verification

• Monitoring and alerts for low disk space

• Content metrics and relevance in server pages

• Zooming improvements for maps

• Kerberos support for PostgreSQL and Teradata connections

• On-demand connections

• Progressive loading of dashboards

• Hardware-based defaults for single-server installations

• Project Leader enhancements

Revision history for workbooks

Every time you publish a workbook, Tableau can now save a version of that workbook to its revision history. Then, if you want to revert to a previous version of the workbook, you can go to the workbook in Tableau Server, view its revision history, download the version you need, and then republish it to the server. For more information, see Work with Content Revisions.

Support for manual-only repository failover

You can now disable automatic failover of the active PostgreSQL repository. You can disable automatic repository failover to control failover manually by using the failoverrepository command. For more information, see the clustercontroller.pgsq1.failover option in tabadmin set options.
PostgreSQL database verification

You can now use the `tabadmin verify_database` command to verify that the PostgreSQL database does not contain any errors that would cause a restore to fail. For more information, see Verify the Tableau Postgres Database.

Monitoring and alerts for low disk space

Because low disk space can reduce server performance or even cause the server to stop responding, you can specify disk space thresholds and get alerts when space falls below them. Alerts continue until disk space rises above the warning threshold. You can also use a new Server Disk Space Administrative View to track recent changes in disk space. For more information, see Quick Start: Disk Space Alerts.

Content metrics and relevance in server pages

Find the right content quickly on Tableau Server and Tableau Online through metrics-based search results and sort options. List view and thumbnail view display metrics as well.

Zooming improvements for maps

Zooming in map views just got easier. You can now scroll or pinch and stretch to zoom in and out of a point on a map.

Kerberos support for PostgreSQL and Teradata connections

Tableau Server now supports Kerberos for connections to PostgreSQL and Teradata databases. For more information, see Kerberos Requirements.

On-demand connections

When you load a workbook published to Tableau Server, Tableau connects only to the data sources that are required to display your data. This means that if there are multiple tabs in a workbook, Tableau only connects to the data sources for the current tab so that you can
view your data as soon as possible. For data sources that require authentication, now you only have to enter your credentials for the current tab or worksheet. As a result, when you view a shared workbook, you can view the workbook tabs for which you have data credentials. Previously, you needed to have credentials to all the data sources in the workbook before you could view any of the workbook tabs.

Progressive loading of dashboards

Dashboards load progressively so that you can view and interact with your data faster. Rather than wait for the entire dashboard to load, you can start analyzing your data as soon as the first section has finished loading.

Hardware-based defaults for single-server installations

The Tableau Server installer detects your computer's hardware and then creates an optimal default configuration for single-server installations. The default configuration determines the number of Tableau Server processes that will run, based on the hardware resources Tableau finds on the computer. If you run a distributed installation, only the primary computer in the cluster is configured with the new defaults. The optimal defaults are intended to serve as a good starting point for you to further optimize performance. For more information, see Primary Server Installation Defaults.

Project Leader enhancements

Users with the Project Leader permission can now change ownership of content, move workbooks between projects, and run extract refresh schedules. For more information, see Use Projects to Standardize Permissions.

Added in Version 9.2

The following features and enhancements were added in Tableau Server 9.2.
• Default permissions in projects
• Lock content permissions to the project
• Support for OpenID Connect
• Updated toolbars for views and web editing
• Web editing enhancements
• Find your current location in a map view
• Enhanced logging by Server Resource Manager

**Default permissions on projects**

Administrators and project leaders can set the permissions for a project, and set the default permissions for the workbooks and data sources in the project. As a result:

• Permission capabilities are now relevant for each content type in the project. For example, only the **View**, **Save**, and **Project Leader** capabilities are available for projects.

• The default permissions apply to all content published to the project. Default permissions can only be changed at the project level.

• Administrators and project leaders can give each project a unique set of default permissions.

**Note:** New projects in the site still start with a copy of the permissions defined for the **Default** project.

For more information, see Set Default Permissions at the Project Level.
Lock content permissions to the project

Administrators and project leaders can lock content permissions in a project, and prevent users from changing the permissions of any content in the project. When project permissions are locked:

- The default permissions are used for all workbooks (including views) and data sources in a project.
- Users (including content owners) cannot modify permissions for individual workbooks, views, and data sources in the project.

Note: Because you can lock content permissions to the project, the Assign Permissions to Contents button has been removed for projects and workbooks.

For more information, see Quick Start: Lock Project Permissions and Lock Content Permissions to the Project.

Support for OpenID Connect

Tableau Server now supports OpenID Connect for authentication and single sign-on (SSO). You can configure the server to redirect users to an OpenID Connect identity provider (IdP) (for example, Google), where a user signs in with the user name and password that he or she normally uses with that provider. The user is then automatically signed in to Tableau Server. For more information, see OpenID Connect.

View and authoring toolbar enhancements

The view and authoring toolbars and interfaces have been updated and a few commands have changed.
Manage and create custom views by clicking Original View or the name of the current custom view. Custom views no longer are referred to as Remember my changes.

The Export menu has been replaced with Download. To export a view as an Image, Crosstab, Data, or PDF, and to download a workbook, use the Download menu.
Web editing enhancements

The following functionality is now available as you edit views on the web:

- Drag all or part of a formula to the Data pane to create a new field.

- Right-click on a dimension in the Data pane and convert it to a measure, or right-click on a measure and convert it to a dimension:
You can also right-click to change a field’s data type, to set a default aggregation or geographic role, or to covert a measure or a date field from continuous to discrete—or from discrete to continuous.

- If you upload a workbook that uses blended data, you can see a link icon next to the field or fields in the primary data source that are being used to link the two data sources:

You can click on the link icon to activate or deactivate specific fields. When fields that can be used as linking fields are not being used, the link icon changes appearance:
The colors that you set for the sheet tabs in Tableau Desktop also display when you edit the views in Tableau Server.

Find your current location in a map view

You can now quickly zoom to your current location in a map view.
Enhanced logging by Server Resource Manager

Administrators can now see incremental increases and decreases in memory and CPU usage for each of the processes that Server Resource Manager monitors. Entries are written into the logs for each process. Logs are located in:

<install directory>\ProgramData\Tableau\Tableau Server-\data\tabsvc\vizqlserver\Logs.

Added in Version 9.1

The following features and enhancements were added in Tableau Server 9.1.

- Scheduled synchronization of Active Directory groups
- Authentication for connected devices
- Mutual (two-way) SSL authentication
- SAML Logout
- Single Sign-on for SAP HANA
- Web data connectors

Scheduled synchronization of Active Directory groups

Server Administrators can synchronize all Active Directory groups in Tableau Server on-demand or on a scheduled basis. For more information, see Quick Start: Synchronize All Active Directory Groups on a Schedule.
Authentication for connected devices

When mobile users connect to Tableau Server, administrators can control whether mobile users must sign in and provide their credentials every time they connect to Tableau Server, or if users can connect with their devices to Tableau Server without signing in after their device is successfully authenticated. For more information, see Authentication for Connected Devices.

Mutual (two-way) SSL authentication

Tableau Server now supports mutual SSL authentication between Tableau Server and clients (Tableau Desktop, web browsers, and tabcmd.exe). For more information, see Quick Start: Mutual (Two-Way) SSL Authentication.

Note: When Tableau Server is configured for mutual SSL, you cannot sign into Tableau Server using a version of Tableau Desktop earlier than 9.1. If you sign in with an earlier version of Tableau Desktop and fallback authentication is not configured, an error displays: "Invalid username or password". If fallback authentication is configured, you are prompted for your user name and password. See Quick Start: Mutual (Two-Way) SSL Authentication for details about fallback authentication.

SAML Logout

Users who sign in to Tableau Server using SAML SSO functionality can now terminate their session by signing out of server. This standards-compliant solution helps ensure SOX compliance through providing support for both Service Provider (SP) initiated logout and Identity Provider (IdP) initiated logout, with Tableau Server being the Service Provider and a third party solution like Ping Federate being the SAML Identity Provider. For more information about SAML and Tableau Server, see SAML Requirements.
Note: If you are using SAML with a version of Tableau Server prior to 9.1, see What's Changed - Things to Know Before You Upgrade.

Single Sign-On for SAP HANA

Tableau Server now supports single sign-on (SSO) for SAP HANA when SAP HANA is configured to support single sign-on (SSO). Users can sign in to their SAP HANA server and then access and publish data to Tableau Server, without having to re-enter their user name and password. For more information, see SAP HANA SSO. Note: Tableau Server requires SAP HANA driver version 1.00.9 or later to support SSO for SAP HANA.

Web data connectors

You can import web data connectors to Tableau Server. This gives you an opportunity to vet web data connectors before you make them available for users. Extracts that were created by imported web data connectors can also be refreshed on the server. You can manage web data connectors on the server using new tabadmin commands. For more information, see Web Data Connectors in Tableau Server.

Added in Version 9.0

The following features and enhancements were added in Tableau Server 9.0.

- Streamlined user interface
- Improved server management
- Improved user, group, and permission management
- Scheduled synchronization of Active Directory groups
- New server processes
- Faster performance
- High availability
- New tabadmin and tabcmd commands

Streamlined user interface
Tableau Server 9.0 features improved workflow, quick access to information, and simplified search and content management.

- A server-based service supports the rewritten web client, which is faster, more scalable, and more extensible.
- New content pages show all content by type (projects, workbooks, views, data sources) in a single place. Each page includes key information about the content, including related items and actions.
- Site navigation is streamlined. Administrators and users can switch more easily between sites and content.
- Search all content types at once using the new quick search box at the top of the page.
- View content faster by scrolling instead of paging through content.

Improved server management
Improved views, alerts, and secure communication options simplify server management

- Built-in administrative views are redesigned for improved loading and faster performance, more in-depth analytics, and an interface that’s easier to understand. For information, see Administrative Views.
- Email alerts for server processes are consolidated so that it’s easier to check server
health. For information, see Configure Server Alerts.

- The server supports enabling SSL for communication between server components and the PostgreSQL repository. For information, see Configure Internal SSL.

**Improved user, group, and permission management**

Manage users, groups, and permissions with a streamlined workflow.

- *Site roles* for users replace license levels and user rights. For information, see Set Users' Site Roles. Note that license levels are still used when you use the `tabcmd addusers` command to import users. For more information, see CSV Import File Guidelines.

- If a user is disabled in or is deleted from Active Directory, the user is removed from Tableau Server groups and becomes unlicensed.

- A redesigned permissions interface provides responsive visual feedback on effective and resulting permissions. You can now view and modify permissions for content in a single view. For information, see Quick Start: Permissions and Content Access and Ownership.

- Monitor the status of server licenses on the Licenses page, and by using the `tabadmin licenses` command. For information, see View Server Licenses.

**New server processes**

The following new processes help manage API requests, clusters, and high availability.

- **API Server.** This process is used when you interact with the server via REST API.

- **Cache Server.** This distributed process manages a shared query cache across the server cluster and is used by the VizQL Server, Backgrounder, and Data Server processes.

- **Cluster Controller.** This process runs on every computer in a cluster and works
with the Coordination Service to report process status and coordinate failover for high availability.

- **Coordination Service (zookeeper)**. This process runs on every computer in a cluster, manages leader election when needed, and ensures that there is a quorum for making decisions during failover.

- **File Store**. This process ensures that extracts are available on all nodes of a cluster that is configured with a File Store process.

For information about the new processes, see Tableau Server Processes and [Improved High Availability and Data Engine Scale](#).

You can see process status on the server Status page or by using the `tabadmin status --verbose` command.

The following processes from earlier versions of Tableau Server are changed or removed:

- In the Data Engine process, you are no longer limited to running only two data engine nodes per cluster. This new flexibility can improve server clusters that are used for extract-heavy scenarios.
  
- rSynch is removed; its functionality is now handled by File Store.

### Faster performance

Performance enhancements make workbooks load faster, improve dashboard performance, and make interactivity more seamless with faster results and response.

- Parallel queries take advantage of the capabilities of source databases to execute more queries at the same time. Each query is faster, and independent queries start at the same time.

- Data engine vectorization speeds up the performance of extract-based workbooks.

- Parallel aggregation uses multiple cores in Tableau extracts and other file-based
data sources.

- Temp table support in the Data Server makes querying more efficient with databases that use temp tables, such as SQL Server.

- External query caching re-opens workbooks with Tableau extracts more quickly because queries are not re-run every time you open a workbook.

- Query Fusion recognizes related queries in a dashboard and combines them so there are fewer queries to execute.

- Shadow extracts create faster data source access for large text files and Excel files.

For information about optimizing Tableau Server performance, see Performance Tuning Examples.

High availability

Tableau Server provides a more secure, more robust high-availability solution with straightforward configuration and management features for administrators.

- More robust failover support:
  
  - An updated user experience improves cluster configuration.
  
  - The Cluster Controller process centralizes failure detection and response.
  
  - You can manually trigger Repository failover and failback using the `tabadmin` utility.

  - You can set a preferred active Repository (via a new user interface) for better support of asymmetrical hardware configurations.

- New workflows and feedback during configuration make it easier to configure a server deployment for high availability and ensure that data and server information are safe in the process.

  - A new data extract storage process (File Store) provides significant speed...
improvements and makes data replication more reliable.

- Tableau Server no longer restricts the number of Data Engine nodes per cluster.
- All Data Engine nodes are active and data is replicated between them, which eliminates the need for failover of the Data Engine processes.

For information, see Improved High Availability and Data Engine Scale and High Availability.

New tabadmin and tabcmd commands

The `tabadmin` utility has new commands, including:

- `decommission`
- `failoverrepository`
- `manage_global_credentials`
- `recommission`
- `regenerate_internal_tokens`

In addition, the `cleanup` command includes a new `--reset-coordination` option that extends the cleanup procedure to data maintained by the new Coordination Service.

The `tabcmd` utility features these improvements:

- Faster startup and execution.
- Support for Unicode.
- Support for the new `--role` option for the `createusers`, `createsiteusers`, and `syncgroup` commands.
- The following new commands:
  - `deletesiteusers`
  - `editdomain`
  - `listdomains`
Web Authoring and Tableau Desktop Feature Comparison

For anyone familiar with Tableau Desktop and new to the Tableau Server web authoring environment, this topic provides a summary of the web features that you use similarly to the way you do in Tableau Desktop. It also lists some fundamental differences between the two environments.

**Note:** This topic is not intended to cover every difference between the desktop (client) and server environments. The intention is to summarize the core authoring functionality.

Web authoring capabilities

In the Tableau Server web environment, you can create workbooks from published data sources, connect to published data sources, and edit views.

Administrators can set at the site level whether users can edit views directly on the server. When web authoring is allowed (as it is by default), users with **Web Edit** permissions can edit workbooks, create new workbooks from published data sources, connect to published data sources, and create and edit views and dashboards.

Data management

- Connect to published data sources.
- Blend published data sources.
- Change aggregation of measures in the view. Change the default aggregation of measures in the Data pane.
- Duplicate, hide, or rename fields.

Version 10.2; Last Updated 12/3/2019
Copyright © 2018 Tableau Software®. Legal & Privacy
• Change the data type of fields.
• Convert measures to dimensions or vice versa.
• Convert a discrete field to continuous and vice versa. This option is available for measures and date dimensions.
• Assign a geographic role for a field.
• Use sets (not create).
• Use parameters (not create).

Filtering and Sorting
• Create, edit, rename, duplicate, and clear sheets (views and dashboards) in a workbook.
• Use data highlighting.
• Add, modify, and remove filters (shown as Quick Filters), and edit a quick filter layout. (General, Wildcard, Condition, and Top tabs are not available.)
• Filter across published data sources.
• Show hidden fields, and exclude or remove fields from the view.
• Sort fields in the view in ascending or descending order.

Analytics
• Create, edit, rename, duplicate, and clear sheets (views and dashboards) in a workbook.
• Drag fields to the view, Rows, Columns, and different mark types in the Marks card.
• Use Show Me to create views.
• View underlying data (via tooltips).
• Create and edit calculated fields.

• Create and edit table calculations, and use quick table calculations.

• Use the **Analytics** pane to drag reference lines, trend lines, and other objects into the view. Edit reference lines and bands. Create and configure reference distributions on a continuous axis.

• Create groups by selecting marks in the view and then clicking Group Members (paperclip) in the tooltip for that selection.

• Show labels, totals, and subtotals.

• Show and hide cards for captions, filters, and highlighters.

• Show and hide headers in the view.

• Swap X and Y axes. Resize axes in the view.

• Change the view size.

**Formatting and layout**

• Edit workbook formatting.

• Change the color palette. For categorical fields, you can assign specific colors and custom colors (using hex code) to data items.

• View device-specific dashboard layouts (not create or edit).

• Add objects, including horizontal and vertical layout containers, blank space, and web page objects to a dashboard.

• Evenly distribute views in a dashboard. Set a dashboard item’s exact size and position.

• Select a background map in map views.

• For legends per measure, Tableau assigns the default color palette to each new color.
legend. Note that for version 10.2, editing the color palette for each new legend is not directly available in web authoring. To use unique color palettes for each color legend, create the view in Tableau Desktop, edit the color palette for each legend, and then publish the view to Tableau Server. For more details, see Legends per measure.

General differences in web authoring

- You can create new workbooks only from data sources published to the same site on the server.
- You can connect only to published data sources from a new or existing workbook.
- Data model editing is not supported.
- You can view stories but not create or modify them.
- You can access right-click menu actions on Measures and Dimensions in the view, but not on every item in the workspace.

See also

Set a Site’s Web Authoring Access
Work in the Web Authoring Workspace
Set Web Edit, Save, and Download Access on Content

Developer Resources

The Developer Portal on the Tableau Community is the place to go for everything related to extending and automating Tableau. There you can get access to the following:

- JavaScript API—Integrate Tableau views into your own web applications.
- REST API—Manage provisioning, permissions, and publishing on Tableau Server.
or Tableau Online via HTTP. The REST API gives you access to the functionality behind the data sources, projects, workbooks, site users, and sites. You can use this access to create custom applications or to script interactions with server resources.

- **Tableau SDK**—Use C, C++, Java, or Python to create extracts from any data and then to publish your extracts.

- **Web data connector**—Create a Tableau connection in JavaScript to almost any data that's accessible over HTTP. This can include internal web services, JSON data, XML data, REST APIs, and many other sources.

- **ODBC connector**—Create a connection using ODBC (Open Database Connectivity), which is a data-access protocol that's supported by a wide array of data sources. In Tableau Desktop, you can connect to any ODBC-compliant source using the built-in ODBC connector.

In addition to these resources, you can get complete documentation and examples, and collaborate with the Tableau developer community.

*Go to the Developer Portal*

**Quick Starts**

Quick Starts are one-page articles that let you quickly review how a feature works and that provide links to more detailed information.

This topic lists the Quick Start categories for Tableau Server. You can find Quick Starts for other Tableau products here:

- **Tableau Desktop**
- **Tableau Online**
Quick Starts for Tableau Server Users

- Manage Your Content
- Quick Start: Stay Connected with Automatic Sign-In
- Search Content
- View and Sort Content
- Quick Start: Custom Views
- Work with Content Revisions
- Share Views
- Subscribe to Views
- Tableau Mobile: Analyze Data Anywhere

Quick Starts for Site Administrators

- Quick Start: Permissions
- Quick Start: Lock Content Permissions to a Project
- Set Up Subscriptions

Quick Starts for Server Administrators

- Quick Start: Creating a Backup Primary
- Quick Start: Distributed Server
- Quick Start: Configuring Failover & Highly Available Gateways
- Quick Start: Disk Space Alerts
- Quick Start: Mutual (Two-Way) SSL Authentication
- Quick Start: Refresh Extracts on a Schedule

- Quick Start: Generate a Snapshot of Server Logs

- Quick Start: Single Sign-On with Kerberos

- Quick Start: Single Sign-On with SAML

- Quick Start: Synchronize All Active Directory Groups on a Schedule
Copyright

© 2018 Tableau Software, Incorporated and its licensors. All rights reserved.

Additional information regarding Tableau's copyrights, patents and trademarks can be found at www.tableau.com/ip.

For information about Third Party Code which may be distributed with the Software, please review the Tableau Software End User License Agreement.
Welcome to the Tableau Server User Guide

The User Guide is for business users—people who go to Tableau Server to see and interact with views in a web browser. This guide is also useful for analysts/authors, or as we also refer to them, content owners—people who create workbooks and views and publish them.

If this is the first time you’ve ever seen Tableau Server and you’re not sure what you can do with it, watch this five-minute video.

To view more training and introductory videos, go to Free Training Videos on the Tableau website.
Explore Content
Sign in to Tableau Server

You use a Tableau Server account to browse content on the server. Your Tableau Server administrator assigns you a site role, which determines how you can work with Tableau Server—for example, whether you can publish, interact with, or view content.

Get sign-in credentials

When you sign in, you provide your sign-in credentials, that is, your user name and password. Your sign-in credentials are based either on your Active Directory user account, or on the Tableau Server user management system. Contact your administrator if you do not know your user name or password.

Change the sign-in account

Depending on how your server is configured, you might be signed in automatically. If you are signed in automatically to the wrong account, you can switch to the correct account.

1. Click Sign Out on the user menu in the upper-right corner of the page.
2. Type your user name and password, and then click **Sign In**

![Sign In](image)

**Note:** Tableau Server always stores a session cookie when you sign in, so your web browser must be configured to allow first-party cookies.

**Sign in to a site**

If you are a member of multiple sites, you're prompted to select one when you sign in to the server. Either click a visible site name or search for a name to select from a list of matching sites.

![Select a Site](image)
The name of the current site is displayed on the site menu.

Sign in with SAML

If Tableau Server is configured to use SAML authentication, you will see a sign-in prompt from an external identity provider (IdP) instead of the Tableau Server Sign In prompt. For example:

- Please sign on first and we’ll send you right along.

  Username
  jsmith
  Password
  ************

  Sign On  Cancel

When you sign in with SAML, your ability to sign out of Tableau Server depends on whether or not Tableau Server is configured for SAML logout. If you do not see a Sign Out com-
mand on the Tableau Server user menu, you must use the sign-out interface provided by the IdP. If Tableau Server is configured for SAML logout, you will see the **Sign Out** command.

**Sign in with mutual SSL**

If Tableau Server is configured to use mutual SSL authentication, you might see a certificate selection dialog box. (Whether you see the dialog box, and whether you see it each time you log in, depends on the browser you are using and if there are multiple certificates on your computer.) If Tableau Server is configured for fallback authentication, you can cancel out of the certificate selector and use your user name and password to sign in.

**Navigate Tableau on the Web**

**In this article**

- An overview of the web workspace
- Identify your site
- Navigate to views
- View and sort content
- Interact with views

**An overview of the web workspace**

When you sign in to Tableau, the first page you see will look something like the following example. From this page, you can explore the content that is available to you by searching, filtering, and sorting the view.

The pages you can see and the options available to you are based on your site role and content permissions.
The main page includes the **Projects, Workbooks, Views,** or **Data Sources** menus. As you click these options, each page shows related content you can access.

- A - Site menu available (if you are a user in more than one site)
- B - Quick search
- C - Favorites search
- D - Your user settings and content
- E - Content menus
- F - Filtered search

If you have access to multiple sites, you select one when you sign in. You can then navigate to content on other sites by selecting them from the site menu.
Identify your site

If the server is running only one site, the browser URL will include #, but not site or the site ID. If you see the following, you are using Tableau’s built-in site, named Default.

If the server is running multiple sites, the web browser URL will displayed will include #/site/ followed by the site ID for your site.

Navigate to views

To get to a view, do one of the following:

- Click Projects, click a workbook, and then click a view thumbnail or name.
- Click Workbooks, and then click a view thumbnail or name.
- Click Views, and then click a view thumbnail or name.
View and sort content

In the Projects, Workbooks, Views, or Data Sources pages, you can search, view, and sort content. When you select items of interest, you can change permissions, download the content, and perform a variety of other actions.

View content as lists or thumbnails

Icons at the top of the Projects, Workbooks, and Views pages let you display items as lists or thumbnails.

Here’s list view.
And here's an example of thumbnail view.

In thumbnail view, hover over workbook and view thumbnails to see sparklines showing popularity over the past 12 weeks.
Sort content

Depending on the type of content, you can sort by characteristics such as name, owner, number of views, creation date, and so on.

To sort items, click the **Sort By** drop-down arrow. This example shows the sorting options for views. (The Least-Most and Most-Least options sort based on relevance.)
You can also sort a list by clicking the column heading. An arrow indicates the order: ascending (up arrow) or descending (down arrow). To sort using multiple options, click the sort type in inverse order. For example, to sort on project first, workbook second, and name last, click those sort types in inverse order (name, workbook, and then project).
Sort data sources by the number of connected workbooks, by last extract or modified date, or by whether alerts exist for refresh or latency issues. From the View menu, choose Connections to see data source type and authentication details.

Interact with views
When you open a view, the options available to you on the view toolbar may vary depending on the site configuration and your permissions. Commands that may be available to you include: Share, Download (data, crosstab, image, PDF, or workbook), Edit, Subscribe, Original View (the ability to save custom views), and Full Screen.

![Example of a view open for interaction](image1.png)

An view open for interaction

![Example of content actions available for a view](image2.png)

Example of content actions available for a view

When a workbook contains multiple sheets, they can be shown as tabs along the top of the page (using the Tableau Desktop option **Show Sheets as Tabs**). You can navigate a tabbed workbook by clicking the sheet tabs.
Sheets shown as tabs in the view

Whenever you are looking at a view, you can navigate back to a **Projects**, **Workbooks**, or **Views** page by clicking a breadcrumb link.

Breadcrumb links above the view

**Search Content**

Tableau Server lets your search content in a variety of ways. The quick search field at the top of the page searches the entire site for matching resources of any kind. Filtered search finds matches using search criteria that are specific to each resource type, such as modified date for workbooks, and connection type for data sources. You can also find workbooks or views that you've marked as **favorites**.

Both quick search and filtered search support attributes and operators that help you set the scope of the search. For example, you can limit a search to just titles of views, or use operators like **and** and **not**.

**Tip:** Search in Tableau Server is not case sensitive.
In this article

Quick search
Filtered search
Search attributes
Search operators
Spaces and search

Quick search

Use the quick search field at the top of the page to find resources anywhere in the site.

Quick search looks for matching text in resource names, owners, tags, captions, comments, and other information across the site. As you type, the top items that match your search text appear, ordered by relevance. Relevance is based on number of page views, recent activity, and your favorites. For data sources, the number of connected workbooks and views is also considered.

In the search results, you'll see the total number of page views and favorites for a resource. Hover over an item to see a tooltip that tells you more about it.
Note: Quick search restricts searches to published data sources only. To search on embedded data sources (workbooks that use a data connection only), use a filtered search.

Filtered search

With filtered search, you can use a combination of search text and filters to find your content.

Each content page has different filters available that are relevant to the resource type. When you enter a search term and select General Filters, those search options apply to every content type. For example, you could type "sales" and you could get relevant results for that term in the Projects, Workbooks, Views, and Data Sources pages.
1. Go the page for the resource type you want to search and filter. For example, if you want to search for data connection information, click the **Data Sources** menu, and then use the Data Source Filters section of the Filters pane.

2. Enter text in the main search field, and then press the **Enter** key.

3. Click a filter, and enter a search term for filter value. Select a filter value, or select from other available filter options.

To remove a filter, click **Clear** at the top of the Filters pane.
To remove all filters, click **Clear All Filters** at the top of the Filters pane.

Click the Filters button to collapse or open the Filters pane and reset the filters to their defaults.

The toggle is a dark icon ( ) when the Filters pane is open and a light icon ( ) when the Filters pane is closed.

**Search attributes**

In addition to a general search, you can limit search on Tableau Server to a specific attribute such as name, workbook, data source, and so on.

To include a search attribute, use the following syntax in the search box:

`<attribute-name>:search-text` (with no spaces on either side of the colon).

For example, to return only items whose names contain the words *sales* or *projections*, type the following:

```
name: sales projections.
```

You can include multiple attributes to further limit a search. For example, to find all dashboards that are owned by Smith, type the following:

```
sheettype: dashboard owner: smith
```

A complete list of attributes is shown below.
<table>
<thead>
<tr>
<th>This attribute...</th>
<th>Followed by...</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>name:</td>
<td>search term</td>
<td>Items with names that match the search term</td>
</tr>
<tr>
<td>title:</td>
<td>search term</td>
<td>Views with titles that match the search term</td>
</tr>
<tr>
<td>caption:</td>
<td>search term</td>
<td>Applies to views with captions.</td>
</tr>
<tr>
<td>owner:</td>
<td>user name</td>
<td>Items that are owned (published) by the specified users. <strong>Note:</strong> Prior to 8.2, owners were listed as publishers in Tableau Server. The <code>publisher</code> search attribute is still supported and returns the same results as the <code>owner</code> attribute.</td>
</tr>
<tr>
<td>publisher:</td>
<td>user name</td>
<td>(See owner above)</td>
</tr>
<tr>
<td>project:</td>
<td>search term</td>
<td>Items that are part of a project whose name matches the search term</td>
</tr>
<tr>
<td>comment:</td>
<td>search term</td>
<td>Views whose comments match the search term</td>
</tr>
<tr>
<td>tag:</td>
<td>search term</td>
<td>Items whose tags match the search term</td>
</tr>
<tr>
<td>field:</td>
<td>search term</td>
<td>Views with matching fields on the rows, columns, level of detail, pages, or encoding shelves</td>
</tr>
<tr>
<td>sheettype:</td>
<td>view, dashboard, or story</td>
<td>Views that are of the matching sheet type</td>
</tr>
<tr>
<td>class:</td>
<td>type of data source (e.g., mysql)</td>
<td>Views and data sources that are associated with the matching type of data source</td>
</tr>
<tr>
<td>dbname:</td>
<td>name of database</td>
<td>Published data sources that are associated with the matching data source</td>
</tr>
<tr>
<td>nviews:</td>
<td>number</td>
<td>Workbooks that contain the specified number of views</td>
</tr>
</tbody>
</table>
**Note:** Quick search restricts the searches of `dbname` to published data sources only. To search on embedded data sources (workbooks that use a data connection only), use filtered search.

### Search operators

You can use `and`, `or`, `not`, and `*` with search phrases, including combining them with attributes, to build search expressions. For example, if you want to search for all items that do not match a specific phrase, or to match one phrase or another but not necessarily both.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>and</code></td>
<td>Returns items that match both search terms.</td>
<td><code>sales and marketing</code>; <code>pens and paper</code></td>
</tr>
<tr>
<td><code>or</code></td>
<td>Returns items that match either search term.</td>
<td><code>west or east</code>; <code>soccer and football</code></td>
</tr>
<tr>
<td><code>not</code></td>
<td>Excludes items that match the search term following this operator</td>
<td><code>not sheettype:dashboard</code></td>
</tr>
<tr>
<td><code>*</code></td>
<td>Acts as a substitute for any character or word following or as part of the search term. This operator can be used by itself or at the beginning or end of the search term. This operator is useful when you don’t know the exact term you are searching for.</td>
<td><code>dev* sales*</code></td>
</tr>
</tbody>
</table>

### Spaces and search

If your search phrase includes spaces, punctuation, or reserved terms such as `and`, `or`, or `not`, enclose your search phrase in double quotation marks.

### Mark Favorites

To make it easy to find your most-used workbooks, views, or published data sources, you can mark them as favorites.
Mark a workbook, views, or published data source as a favorite

- Select the favorites star next to the content.

Alternatively, from the list view, create a favorite by clicking the star next to the workbook, view, or published data source.

<table>
<thead>
<tr>
<th>Name</th>
<th>Views: All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tale of 100 Start-ups</td>
<td>5</td>
</tr>
<tr>
<td>Economic Indicators</td>
<td>4</td>
</tr>
<tr>
<td>Investing in the Dow</td>
<td>0</td>
</tr>
<tr>
<td>Volatile Year for Technology</td>
<td>0</td>
</tr>
</tbody>
</table>
The content is added to your Favorites menu.

Remove an item from Favorites

- Click the star that you used to mark the favorite.

Search Favorites

- Click the Favorites menu in the upper-right corner of the page. Type a search term to filter the list.
On the Favorites menu, ⭐️ indicates a view, ⚖️ indicates a workbook, and ⛓️ indicates a published data source. Results are listed in alphabetical order.

If you have a large number of favorites, type a search term to filter the list or scroll to see all of them.

**Manage Content**

In Tableau Server, content pages show available projects, workbooks, views, and data sources. On your private content page, you can also view all the content you own. The content and options you see are based on your site role and content permissions.

**In this article**

- Use shared content pages
- Use your private content page
Select content and perform actions on it

Use shared content pages

Projects, workbooks, views, and data sources each have their own content pages with options that are specific to that content type. For example, a workbook content page includes menus for the views in the workbooks, data sources connected to the workbook, subscriptions, permissions settings, and details.

Each content page provides information such as the owner, and number of page views and favorites.
You can access actions that you're allowed to take on the content.

A breadcrumb trail at the top each content page shows your location in the site.
Each content item has a Details page. If you own the content and have appropriate permissions, you can edit the description, move the workbook to another project, change the owner, and more.

Projects

A project page includes the workbooks, views, and data sources in that project, as well as the default project permissions and project details.
Workbooks

A workbook page includes the views and data sources used by the workbook, and the workbook permissions and details.
Views

In a workbook, click a view to show the view and display options for interacting with it.
Data sources

In a site or a project, click **Data Sources**, and then click a data source name. The content page shows connections, refresh schedules, connected workbooks, permissions, and details.

![Data Sources](image)

Use your private content page

To see the content you own, click your name at the top of the page, and then click **My Content**.

![Private Content Page](image)

Your content page includes your user information, the workbooks and data sources that you own, your subscriptions, and your account settings.
Click **Settings** to go to your account settings from your content page.
Select content and perform actions on it

On the **Projects**, **Workbooks**, **Views**, and **Data Sources** pages, click check boxes to select content. Then click the **Actions** menu ( . . . ) to access commands available for that content.
Notes When you select multiple items, the Actions menu might display options that don't apply to all selected items. When you perform these actions, Tableau Server will notify you of success or failure for individual items.

To select all content on the page, click the drop-down arrow next to \textit{n selected}, and click \textbf{Select All}. To clear a content selection, click the drop-down arrow, and click \textbf{Clear}. 
If many items are available on a page, click the **Actions** menu (…) to select the item and see the available commands. In thumbnail view, the **Actions** menu is displayed in the upper-right corner of the thumbnail.
In list view, the **Actions** menu is displayed to the right of the workbook name.

![Actions menu example](image)

For details on creating a new workbook or editing a view, see Build Views on the Web. For details on connecting to published data sources, see Connect to Published Data Sources.

**Interact with Views**

**Share Views**

Every published view and workbook can be shared via links in email and other applications, or embedded directly into web pages, wikis, and web applications. To see a shared view, users must have permission to access it in Tableau Server.

**Link to a view**

1. Click **Share** in the upper-right corner of the view.

2. Copy the provided link into another application, or click the envelope icon to
automatically create an email message with the link.

**Note:** If you use this link in your own embed code, add the HTML attribute `allowfullscreen="true"` to the iframe element to enable the Full Screen button.

---

**Embed a view**

1. Click **Share** in the upper-right corner of the view.

2. Copy the provided embed code, and then paste it into the source code of the page in which you want to embed the view.
Note: The embed code generated by Tableau automatically refers to the current view. For information about how custom views are displayed, see Embed Code for Custom Views.

Download Views or Workbooks

1. At the top of a view, click Download.

   - **Image**: Downloads an image of the view in .png format.
   - **Data**: Opens a new tab in the browser window and displays the view's data in summary and detail. You can then download the data as a comma-separated value (.csv) file.
   - **Crosstab**: Downloads the view as a .csv file you can open in Microsoft Excel.
   - **PDF**: Downloads a PDF of selected sheets. Under Content, select the part of the workbook you want to download. Then, under Sheets to Download, select specific sheets. (Hold down Ctrl to select multiple sheets.)
Note: If you're downloading a dashboard to PDF format, web page objects aren't included.

- **Tableau Workbook**: Downloads a workbook you can open with Tableau Desktop. As an alternative, you can select **Server > Open Workbook** in Tableau Desktop. This option is available only if you've been given the **Download/Save** permission by the author of the workbook or an administrator.

Note: Downloading extremely large amounts of data can affect server performance and might not complete successfully. If you encounter these issues, try exporting the data directly from the underlying data source.

### Subscribe to Views

Subscribe to a view to receive a snapshot of it by email at regular intervals—without having to sign in to Tableau Server. You can also unsubscribe from views you no longer want to receive.

Note: Server administrators determine whether subscriptions are enabled for a site, and they create the subscription schedules that are available to users.

### Subscribe yourself or others to a view

When you open a view in Tableau Server and you see a subscription icon () in the upper-right corner, you can subscribe to that view or the entire workbook. If you own a workbook or are a project leader or administrator, you can also subscribe other users who have permission to view the content.
1. In a site, click **Views** or **Workbooks**.

2. Open a view, or open a workbook and then a view.

3. In the toolbar above the view, click **Subscribe**.
4. To subscribe to the current view, click **This View**; to subscribe to all views, click **Entire Workbook**.

5. Pick a schedule.

6. If the view contains data only when high-priority alerts exist, select **Don't send if view is empty**.

7. If your Tableau Server account doesn't already have an email address, enter your address.

   To change the email address that a view is sent to, search for "Change Your Email Address" in the Tableau Server Help.

8. If you own the workbook, select **Subscribe me**. To email more people, click **Add**
under **Subscribers Others**.

To change the subscription schedule or email subject line for individual subscribers, or to unsubscribe them, click **Manage** under **Current Subscribers**.

**Note:** To receive a subscription, users must have email addresses in their Tableau Server account and permission to view the content.

9. Click **Subscribe**.

When you receive the email on the subscription schedule, click the image to open the view in Tableau Server.
Unsubscribe yourself from a view

1. Open your account settings on Tableau Server in one of the following ways:
   - Click **Manage my subscriptions** at the bottom of a subscription email.
   - Sign in to Tableau Server, select your name, and then select **My Content** from
the drop-down list.

2. Click **Subscriptions**.

3. Select the check box next to the view you want to unsubscribe from, click **Actions**, and then click **Unsubscribe**.

Both here and on your account settings page, you can also change subscription schedules, subject lines, and empty-view options. For more information, search for "Manage Your Subscription Settings" in the Tableau Server Help.

**Tag Content**

Tags are keywords you can create for workbooks, views, and data sources to help you find, filter, and categorize content in Tableau Server. Authors can add tags to content when they publish the content. After content is published to a Tableau server, you can add tags to any workbook, view, or data source that you are allowed to access, and you can delete any tags you have added.

**View tags**

In a published workbook or view, its tags appear in the tooltip when you hover over the thumbnail. You can also view tags in the **Tags** area located below a view.

Click a tag link to filter the view to any content that uses that tag.
Find tagged content

Use tags to find content with quick search and filtered search.
Add tags

You can add tags to any view or data source on the server that you have permission to access.

To add tags to a single view

In the Tags area below the view, click **Edit Tags**, and then enter one or more words in the text box. Click **Save** when you are done.
To add tags to multiple views

If you have an Interactor-level access, you can also add tags to multiple views at once.

1. Navigate to a list of views or workbooks.

2. Select the views you want to tag, and then select Actions > Tag.

Enter one or more words in the text box, and then click Save Tags when you are done.
To add tags to a data source

In the Data Source page, select a data source, and then select **Actions > Tag**. Enter one or more words in the text box. Click **Save Tags** when you are done.

---

**Delete tags**

You can delete any tags that you have created.

1. Open the tagged view.

2. Scroll to the Tags area below the view.
3. Click the 'x' next to the tag you want to remove.

Refresh Data or Pause Automatic Updates

Tableau Server lets you control how views interact with data sources so you can keep data fresh and improve performance.

Refresh Data

If a data source is changed (for example, with new fields, field names, or data values), the view reflects those changes the next time you load the page. To manually update data while you interact with a view, click Refresh on the toolbar.

When you refresh data, Tableau Server clears any cache and retrieves the latest information from the data source. If you're working with a complex view or a very large data source, refreshing data can take a long time.

Pause Automatic Updates

As you interact with a view, the server sometimes has to query the data source to update the view. To temporarily stop updates so you can more quickly interact with a view, click Pause on the toolbar.

Click Resume to again automatically query the data source as needed.
Sort Data

You can quickly change the sort order for items in a view using the Sort buttons on an axis, field label, or header. For example, the view below shows oil output by well. If you mouse over the vertical axis, a sort button appears that displays the sort it will perform when you click it—in this case, an ascending sort:

Once you sort, the sort icon stays on the vertical axis:

Click the Sort icon again, and it sorts in descending order, from lowest output to highest output:
A third click returns the bar chart to its original state:

You can always revert to the entire view’s original state using the Revert button on the toolbar.

Filter Data

With an Interactor license level, you can filter data in a view so you can narrow the visualization to the data of interest. For example, a regional sales report may show sales for several different regions. You can focus on how your region is doing using filters. Then you can revert the filters to return to the original view and compare your region to others. There are two ways to filter the view: filters in the view and the Keep Only and Exclude tooltip commands.
Types of Filters

There are many different types of filters. The author of the view chooses the type of filter that best shows the values you are filtering. Each type of filter and how you can interact with it is described below.

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiple Values List</strong></td>
<td>Shows a list of check boxes. Select the values to include.</td>
</tr>
<tr>
<td><strong>Single Value List</strong></td>
<td>Shows a list of radio buttons. Select one value at a time to include.</td>
</tr>
<tr>
<td><strong>Compact List</strong></td>
<td>Shows a drop-down list of values. Select one value at a time to include.</td>
</tr>
<tr>
<td><strong>Slider</strong></td>
<td>Shows values along a range. Drag the slider or use the arrows to select a single value to include. For quantitative values use the two sliders to specify a range of values.</td>
</tr>
<tr>
<td><strong>Wildcard Match</strong></td>
<td>Shows a text field. Include all values that contain a specific set of characters. You can use the asterisk symbol (*) as a wildcard character.</td>
</tr>
<tr>
<td>Filter Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Multiple Values</strong></td>
<td>Shows a text field. Type a value and click the plus symbol to include it in the filter. Alternatively, copy and paste a list of values into the text field.</td>
</tr>
<tr>
<td><strong>Date Filters</strong></td>
<td>Date filters can be shown in most of the filter types described above. However, there are a few more types that are specific to dates. For example, relative date filters allow you to include common date ranges such as “last 3 weeks” or “year to date.” Or you can select from a collection of predefined date periods such as 1 day, 1 week, 3 months, etc.</td>
</tr>
<tr>
<td><strong>Multiple Value List (Hierarchical)</strong></td>
<td>If the view uses a multidimensional data source, the multiple value list shows the hierarchical levels. Use the level selectors at the top to select all values at the given level.</td>
</tr>
</tbody>
</table>

**Filtering Options**

Many filters have additional options that display when you hover the pointer over the filter area on the page. For example, sometimes it is easier to select what you don’t want to see than all the things that you do want. Options on the drop-down menu for a multiple value list
let you switch between an **Inclusive** and **Exclusive** filter. Each type of filter has its own set of options available in the drop-down menu in the upper right corner of the filter area. The availability of these options is controlled by the author of the view.

In addition, if a filter contains a lot of values, you can use the search to quickly find and select what you’re looking for. Click the **Search** button that shows when you hover the pointer over the filter in the view. Then start typing the value you are looking for. The results show directly below the search box making it easy to select.

Finally, you can limit the values shown in a filter using the **Show More Values/Show Fewer Values** button. When you show more values, all values from the field are displayed. When you show fewer values, the other active filters are considered. Only values that pass all of the filters are shown. For example, a view may be filtered to show sales greater than $5000 in the Western and Central regions. When you show more values, the Region filter will show all regions. When you show fewer values, the Region filter will only show regions where sales are greater than $5000.

This option shows only if the author of the view turns it on for the filter.
Reverting Filters

If at any time you want to restore the filters to how they were when the view was published, use the Revert button. This action reverts the entire workbook to how it was when it was last published, so any work you did in the workbook may also be reverted.

Explore Data in Maps

Tableau maps can help you quickly find locations and analyze data worldwide. There are many ways you can explore and interact with map views. You can zoom in and out, pan, and select marks with the view toolbar, and even search for locations worldwide with map search.
If you don't see the view toolbar or the map search icon, or if you can't pan or zoom, it's probably because the workbook author has chosen to customize how others can interact with the view.

The workbook author can choose to hide the view toolbar and the map search icon so they do not appear in the view. Similarly, the workbook author can choose to turn off pan and zoom to control how you interact with the view.

For more information, see Customize How People Interact with your Map.

Select marks, pan, and zoom

You can use the view toolbar in the upper left corner of the view to select marks, pan, and zoom in and out of a map view. For more information, see Select Marks and Pan and Zoom.
Search for locations

You can use the map search icon to search for locations in your map view. For more information, see Set Map Search Options.

Find your current location

You can use the locate me button to quickly pan and zoom to your current location. To do so, click the map search icon in the top-left corner of the view, and then, next to the search box that appears, click the locate me button.

Note: When you click the locate me button, you might be prompted by your web browser to allow Tableau access to find your current location. If you block access, Tableau will be unable to zoom to your current location.
Return to the initial view

After exploring, you can return to the initial view of your map. To do so, click the zoom home button on the view toolbar.

Explore Data via Tooltips

Tooltips are data details that appear when you hover over one or more marks in a view.

Click a mark to access options for filtering or removing marks, and viewing data:

- **Keep Only**: Displays only what you’ve selected in the view.

- **Exclude**: Removes what you’ve selected from the view.

- **View Data**: Opens a window displaying the data. You can view the summarized data or the underlying data.

To filter or exclude a group of marks, select them and click the action you want to perform.
To look at the summarized or underlying data, make a selection and click the View Data icon. Then do one of following:

- Click the **Summary** tab to view the aggregated data in the view or in your selection within the view.
Click the **Full data** tab to view the values for each row in the data source—as restricted by the mark or marks you’ve selected.

Select **Show all columns** to view all columns in the underlying data source, whether or not the data is in the view.

Click **Download all rows as a text file** using the links at the top and bottom of the table. A CSV file is generated that you can open and view the data in an Excel spread-
Follow Hyperlinks

Many views contain hyperlinks to either outside URLs or other sheets. These hyperlinks are added by the author and can be useful for getting more information about a set of data points. Based on how the view was authored, hyperlinks can be launched in one of the following three ways:

- **Select** - Click a mark in the view.
- **Hover** - Rest the pointer over the mark in the view.
- **Screen tip** - The hyperlink is available in the screen tip that displays when you rest the pointer over a selection of marks.

Links to Web Pages

A view may link to an outside webpage to show more information about the data. For example, a map view might link from a specific location to show a satellite image. Or, a sales report may link from a selection of products to show the current inventory status on an internal intranet. When you click a link it takes you to the external webpage, which is outside
of Tableau Server. Webpages can also be embedded into a dashboard. In this case, clicking a link loads the webpage in the same window.

Links to Other Views

In addition to linking to external webpages, some views will have hyperlinks to other views on Tableau Server. These links filter data in the target view based on your selection in the source view. For example, in the dashboard shown below, selecting a product in the list of Top Selling Products filters the map view to show where the product is sold.
Highlight Marks, Legends & Actions

Highlighting is a way to call attention to a subset of data in a view. There are several ways to highlight data on Tableau Server. You can use marks, legends, or actions, or you can explore your data interactively using the Highlighter to search for data points in context.

Use Marks to Highlight

When you select one or more marks in a view, all other marks are dimmed so that your selection stands out. Select individual marks or click and drag the pointer to select a bunch of marks. Hold the Ctrl key on your keyboard as you select marks, or use an advanced selection tool to select multiple marks in the view. For more information on advanced selection tools, see View Toolbar in the Tableau Desktop Help.
Use Legends to Highlight

You can use the legends (color, shape, and size) to highlight the marks that correspond to each item in the legend. For example, if a view is colored by product category, you can quickly highlight a certain type of product using legend highlighting. Legend highlighting is enabled by default. To highlight items in the view using the legend, do the following:

1. Select an item in the legend:
2. You can hold the Ctrl key on your keyboard to select multiple items in the legend.

To turn off legend highlighting, do the following steps:

1. In the top menu, click Edit to open the view in web editing mode.

2. In the tool menu, click the highlight icon and select either Disable Workbook Highlighting to turn off legend highlighting for the entire workbook, or Disable Sheet
**Highlighting** to turn off legend highlighting for the specific worksheet.

![Highlighting Menu]

**Highlight data in context**

For particularly large or data dense views, you might want to highlight marks or groups of marks while still maintaining the context of the data in your view. You can turn on the highlighter for discrete dimensions that are shown in your view and then use keywords to search for and highlight marks.

To turn on the highlighter for a field, do the following:

1. In the top menu, click **Edit** to open the view in web editing mode.

2. Right-click on a discrete field (dimension) that is included in the view and impacts the level of detail in the view. Then select **Show Highlighter** from the context menu.
3. Click **File > Close**.

In the Highlighter field, enter key words or partial keywords to search for marks. You can also hover over the items in the drop-down list to do ad hoc analysis.
Highlight Actions

Some views may have Highlight Actions, which highlight related data in one or more views based on your selection in a source view. Highlight Actions are primarily used in dashboard views where multiple views are shown at once. For example, in the dashboard view below there is a highlight action set up to highlight on Region. When West is selected in the scatter plot all the other views highlight the West category.
Depending on the how the view was authored, Highlight Actions can be launched either by selecting a mark, resting the pointer over a mark, or in the screen tip that displays when you rest the pointer over a mark for a period of time.

Comment on Views

You can add comments to any view you have access to on Tableau Server. You can also see any comments associated with a particular view.

Type your text in the Comment text box located below the view and click Post Comment.
You can add formatting to your comment by inserting hyperlinks, bolding, italics, and underlining. Examples of how to add each of these types of formatting are shown in the table below.

<table>
<thead>
<tr>
<th>Format</th>
<th>What to Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperlink</td>
<td>“My Link”:<a href="http://www.tableau.com">http://www.tableau.com</a></td>
<td>My Link</td>
</tr>
<tr>
<td>Bold</td>
<td><em>Bold Text</em></td>
<td>Bold Text</td>
</tr>
<tr>
<td>Italics</td>
<td><em>Italic Text</em></td>
<td>Italic Text</td>
</tr>
<tr>
<td>Underline</td>
<td>+Underlined Text+</td>
<td>Underlined Text</td>
</tr>
</tbody>
</table>

Republishing workbooks with comments

If you want a workbook to keep its comments, use the same workbook name when you republish the workbook. If you republish a workbook that has comments with a new name, the comments are not retained with the new workbook.

Quick Start: Custom Views

If you regularly look at certain views and find you need to make the same changes each time you open the views, you can create custom views that "remember" your changes. Each time you open a custom view, it displays the information you want to see. You can then share custom views with other Tableau Server users who have permission to see the original view.
1 Create a Custom View

Open a view and make the changes you want to save. For example, modify filters, sorting, or zoom level. Click *Original View* on the toolbar and enter a name for your custom view. Select **Make it my default** to make the new view your default view. Click **Save** when you are done.

Your custom view is always displayed with the saved changes. Click a different view in the list to display it. The currently selected view is indicated by a gray background.

Your custom view does not change the original, but is related to it. If the original view is updated or republished, your view is also updated. If the original view is deleted from the server, your custom view is also deleted.

2 Share Custom Views

To make a custom view available for others to view it, select the **Make it public** option when you create the view.
The public view icon ( ○ ) indicates that the view is shared. The private view icon ( ● ) in the Manage dialog box indicates that the view can only be seen by you.

As you browse views on the server, you can see and use custom views that other people have shared.

3 Manage Custom Views

To change the default view, edit a custom view name, delete a custom view, or make it private, click the view name and then click Manage.
The default view is indicated by 📊. To change the default view, click 📊 next to the custom view name in the Manage dialog box.
4 Delete Custom Views

Click the delete icon (_delete_ ) in the Manage dialog to delete the view.

A confirmation message appears asking if you are sure that you want to delete the custom view. Click Delete to remove the view from your custom views list.

**Use Custom Views**

If you notice you are making the same changes to a view every time you open it, you might want to consider saving the changes as a custom view.

For example, in a particular view, you might apply a filter to include only data relevant to you, or you might sort a view differently than how it was published. You might also want to keep different versions of the same view—for example, one with two filters selected, and another with only one selected. Each of these different configurations can be saved as a custom view.

A custom view is always displayed with the latest saved changes. A custom view does not change the original, but is related to it. If the original view is updated or republished, the cus-
tom view is also updated. If the original view is deleted from the server, the custom view is also deleted.

You can also choose whether your custom views are visible to other users (public), or only to you (private).

Save custom views

When you interact with a view, you have the option to save any changes you’ve made to the view (sorting, filtering) as a custom view.

If you make a change to the original view, the Original View menu in the toolbar indicates the view has changed with an asterisk. You can access custom views by clicking the Original View menu, or by clicking the name of the custom view in the same menu location.
Custom views are always associated with the original view. As the original view is updated or republished, customized versions of the view are also updated.

- If the original view is deleted from the server, its associated custom views are also deleted.

- If filters are removed from the original view and it’s republished, the filters will be unavailable in customized versions of the view.

- If filters are restored and the view is republished, customized versions of the view include the restored filters.

To save a custom view

1. Open the individual view that you want to customize.

2. Filter the data, change sort orders, highlight, zoom in or out, or make any other modifications.

3. Click Original View or the name of the currently selected custom view as it is shown
in the toolbar. Enter a name for the custom view. Select whether you want it to be the default view, or if it should be public, and then click **Save**.

**Access and manage custom views**

To see the custom views available for a view, click the **Original View** menu, or click the name of the custom view in the same menu location.

This example shows the original view.
This example shows a custom view name in the same location as **Original View**.

The custom views that you have saved are displayed under **My Views**. Views created by other people, including the **Original View**, are listed under **Other Views**.

To select a view

- Click a view name in the list of views to display it. The currently selected view is indicated by a gray background.

To change the default view

The default view is indicated by ![icon]. To change the default view, click ![icon] next to the custom view name in the Manage dialog box.

1. In a view, click **Original View** or click the name of the custom currently selected view as it is shown in the toolbar.

2. Click **Manage**.
3. Click \[ \text{□□} \] next to the custom view name to make the view the default view. The icon will change to \[ \text{□} \] to indicate the view is now the default view.
4. Click Done.

Advertise a custom view

By default, your custom view is private so only you can see it on your list. If your site role is Interactor or Publisher, you can advertise the view to other users. Anyone who has access to the original published view will be able to see your advertised custom view.

To advertise a custom view, click Make it public when you first create the view. Even if you don't advertise your custom view, you can still share it by copying the URL or clicking Share.

To change the public or private status of a custom view

1. Click Original View or the name of the current view in the toolbar. Select the view you want to edit, and then click Manage.
2. In the **Manage** dialog box, click the public or private view icon to change the view status.

The public view icon (☉) indicates that the view is shared.
The private view icon (ジョン) indicates that the view can only be seen by you.

3. Click **Done**.

**Make a custom view private**

You can always make a public view private. When a custom view is private, it no longer shows in the drop-down list for others and only you can see it on your list of custom views.

1. Click **Original View** or the name of the current view in the toolbar. Select the view you want to edit, and then click **Manage**.
2. In the Manage dialog box, click the public view icon (🔗) next to the view to make it private (🔒).

The public view icon (🔗) indicates that the view is shared.
The private view icon (🔒) indicates that the view can only be seen by you.

3. Click **Done**.

Delete a custom view

You can delete a custom view you created at any time. Removing your custom view does not affect the original view.

**Note:** If the original view is deleted from the server, your custom view is also deleted.

1. When you’re looking at the custom view you want to delete, click the view name in the toolbar, and then click **Manage**.
2. Click the delete icon (trash can) next to the custom view name.

3. Click **Done**.
Create Views and Dashboards

Connect to Published Data Sources

Tableau Desktop users who create and customize data connections for Tableau use can publish their data sources to Tableau Server or Tableau Online. Publishing enables sharing data among colleagues; including those who don't use Tableau Desktop, but have permission to edit workbooks in the web editing environment.

The steps below describe how to connect to published data sources when you’re signed in to Tableau Server or Tableau Online.

For information about how to connect from Tableau Desktop, see Tableau Server or Tableau Online in the Desktop Help’s connection reference.

Connect to a published data source in the web editing environment

You can connect to data if you have permissions to create and edit views.

1. While you’re signed in to your Tableau Server or Tableau Online site, select a view to edit.

2. In editing mode, click the New Data Source icon.

3. In the Connect to Data Source on Tableau Server dialog box, select a published data source from the list, and then click Add.

You can also connect to a published data source when you're creating a new workbook directly on Tableau Server or Tableau Online.

1. When you’re signed in to your site, navigate to the Content page and select Data Sources.
2. In the list of data sources, select the check box next to the one you want to use, and then click **Actions** and select **New Workbook**.

**Build Views on the Web**

To build a view on Tableau Server, you can:

- Edit an existing published workbook and add a sheet (using the same data source).
- Create a new workbook based on a published data source and add sheets in the workbook.
- Edit an existing published workbook and add a sheet, but connect to a different published data source. For details, see Connect to Published Data Sources.

This article also describes how to build three different views about sales data using the **Sample - Superstore** data source.

**In this article**

- Create a new workbook on the web
- Edit a web view
- Create a bar chart
- Create a highlight table
- Create a map view

**Create a new workbook on the web**

1. Sign into a site on Tableau Server.
2. Select **Data Sources** on the Content menu.
3. In the data sources list, select the check box next to the data source you want to use, and then click Actions > New Workbook.

A new, blank workbook opens in the Tableau Server web editing environment.

Edit a web view

1. Sign into a site on Tableau Server.

2. Select Views on the Content menu.

3. Select a view, and then select Actions > Edit View, or click a view to open it, and then click Edit on the view toolbar.

Note: If you don't see the Edit option, ask the content owner or your administrator for web editing permissions.

The view opens in web editing mode.

4. To close the view without saving your changes, select File > Close. To save your work, select File > Save or File > Save As.

The Save options available to you will vary depending on your permissions.

Create a bar chart

This procedure shows how to build a bar chart view that displays a list of technology products and how much profit each has generated.

To build a bar chart:

1. Under Dimensions on the Data pane, drag Category then Sub-Category to the Columns shelf. From Measures, drag Profit to the Rows shelf.
Click the image to replay it.

Tableau now has enough to convert the data into a visualization (view), in this case, a horizontal bar chart.

2. To display only the items under Technology, click the Technology header and select **Keep Only**.
3. To display each bar as a separate color, drag **Sub-Category** to the **Color** card. As a final touch, click the **Color** card to edit the color palette and assign the **Blue** palette.
Click the image to replay it.

4. Right-click the sheet tab, click **Rename Sheet**, type **Bar Chart**, and then click **OK**.

Create a highlight table

This procedure shows how to create a table that lists product profits by category and uses color to highlight the range of sales sizes.

1. Create a new sheet by clicking the New worksheet icon.

2. From **Dimensions**, drag **Segment** to the **Columns** shelf and **Category** and **Sub-Category** to the **Rows** shelf, then drag **Profit** to the **Text** card.
Click the image to replay it.

Your view now displays profit data in a table.

3. Add color to your table by dragging Profit to the Color card and changing the Marks type to square.
Your view now displays data about profits in a table that uses color to highlight the different sales amounts.

4. Give the view a name by right-clicking the sheet tab, clicking Rename Sheet, and typing Highlight Table. Click OK.

Create a map view

This procedure shows how to create a map view from the Sample - Superstore data source. This view will show profits by U.S. state.

1. Create a new sheet by clicking the New worksheet icon.

2. On the Data pane, double-click the State dimension, then under Measures, double-click Profit.

3. On the Show Me menu, click Filled Maps.
Tableau looks for geographic fields in any data source. For more information on how Tableau interprets geographic data in data sources, see Assign Geographic Roles in the Tableau Desktop help.

4. Give the view a name by right-clicking the sheet tab, clicking Rename Sheet, typing Map. Click OK.

5. Click Save As to save the workbook. In the Save Workbook dialog box, complete the following steps:

   - Specify the workbook name, and leave Project set to Default.
   - Select Show sheets as tabs if you created multiple sheets and want their tabs to appear at the bottom of the view.
   - Select Embed password for data source if you want users who do not have an account on the database to be able to see the view.
When you are finished, click **Save**.

Now that you’ve created some views, you can use them in a dashboard. See Best Practices for Effective Dashboards for some tips to consider for dashboards, then go to Create a Dashboard for steps on how to build a dashboard.

**Work with Content Revisions**

When revision history is enabled on your site and you publish a workbook or data source, Tableau Server saves a version of it in its revision history. If you want to revert to a previous version, you can go to the content in Tableau Server and restore that version.

**Note:** On Tableau Server, your administrator can enable revision history for both workbooks and data sources. On Tableau Online, revision history is always enabled, but for workbooks only.

In this topic

- Required permissions for revision history
**Publish your content**

**View revision history**

**Manage revisions**

**Potential revision history issues**

---

**Required permissions for revision history**

To access revision history, you must have a site role of **Publisher**, plus the following permissions for different content types:

- **Project**: View and Save
- **Workbooks in the project**: View, Save, and Download Workbook/Save As
- **Data sources in the project**: View, Save, and Download Data Source

---

**Publish your content**

In Tableau Desktop, click **Server > Publish Workbook** or **Server > Publish Data Source**. Make changes to the workbook or data source, and then publish it again to the same project, with the same name. (You’ll need to confirm that you want to overwrite the existing content.)

You can also save workbook revisions by editing and saving a workbook in the web-authoring interface of Tableau Server.
View revision history

- Select a workbook or data source, and from its actions menu (…), select Revision History.
The following image shows a workbook’s revision history.
Manage revisions

Preview a workbook revision

- From a revision’s actions menu ( . . . ), select **Preview**.

If a preview is available, it opens in a new tab in the browser. For workbooks that you can't preview on the server, such as those with OAuth data connections, you can download the revision and open it in Tableau Desktop.
Download a workbook or data source revision

1. From a revision’s actions menu (…), select **Download**.

![Revision History](image1)

2. Open the downloaded file in Tableau Desktop.

**Restore a workbook revision**

- In the revision history, select a revision, and then click **Restore**.

![Revision History](image2)

The restored version becomes the current version.
**Note**: If a revision can’t be restored directly on the server, download the revision, open it in Tableau Desktop, and republish it.

**Restoring live data connections that require credentials**

When a workbook uses a live data connection that prompts for a user name and password, you have the option to embed credentials for the connection. If the workbook uses a data source with multiple connections, you might need to provide credentials for each one.

**Restoring data extracts with scheduled refreshes and embedded credentials**

When a workbook uses data extracts with scheduled refreshes and embedded credentials, you’ll need to edit the connection to provide the credentials.

**Restore a data source revision**

1. From a revision’s actions menu (...), select **Download**.

2. Open the downloaded file in Tableau Desktop, and then republish it with the same name, to the same location in Tableau Server (confirming that you want to overwrite the existing version).

   The uploaded version becomes the most current version.

**Delete a workbook or data source revision from history**

1. From a revision’s actions menu (...), select **Delete**.

   The revision history list updates to indicate a revision has been deleted.
Tip: To delete the latest revision of a data source, republish it and then delete the second most recent revision.

Potential revision history issues

Overwriting content with the same name

If a different author publishes over a workbook or data source with the same name, the most recent author becomes the owner of the content and can see its entire revision history.

Data changes and deletions

- Workbooks and data sources are downloaded with the latest configuration of their extract or data connection. If the data model or data connection has changed between revisions, you might need to update the downloaded workbook or data source.

- Revisions of workbooks and data sources that use .xls or .csv data are saved with an extract of that data.

- Revisions are saved for TDE files, unless they're on a refresh schedule.

- If a workbook or data source is deleted from a site, all revisions are also deleted.
Turning revision history on and off

If revision history is turned on and then off, saved revisions are retained, and new versions overwrite the latest version. If revision history is then turned on again, version numbering starts from the last saved revision.

Best Practices for Effective Dashboards

A well-designed dashboard can align your organization's efforts, help uncover key insights, and speed up decision-making. Use this topic for tips on best practices for creating effective dashboards in Tableau.

What's your goal?

- Know your purpose and audience
- Leverage the most-viewed spot

Design for the real world

- Author at your final display size
- Limit the number of views
- Be security-savvy

Add interactivity to encourage exploration

- Enable highlighting

Save time

- Use the Go to Sheet command
- Hide sheets as you go
What's your goal?

Know your purpose and audience

The best visualizations have a clear purpose and work for their intended audience. What will you be trying to say with this dashboard? Are you presenting a conclusion or a key question?

In addition to knowing what you're trying to say, it's important to know who you're saying it to. Does your audience know this subject matter extremely well or will it be new to them? What kind of cues will they need? Thinking about these questions before you head into the design phase can help you create a successful dashboard.

Leverage the most-viewed spot

Most viewers scan web content starting at the top left of a web page. Once you know your dashboard's main purpose, be sure to place your most important view so that it occupies or spans the upper-left corner of your dashboard. In the dashboard below, the author decided that the map view holds the key message.
Design for the real world

Author at your final display size

By default, Tableau dashboards are set to use a fixed size and if you keep this setting, be sure to construct your visualization at the size it will be viewed at. You can also set Size to Automatic, which makes Tableau automatically adapt the overall dimensions of a visualization based on screen size. This means that if you design a dashboard at 1300 x 700 pixels, Tableau will resize it for smaller displays—and sometimes this results in scrunched views or scrollbars. The Range sizing feature is helpful for avoiding this.
Limit the number of views

In general, it's a good idea to limit the number of views you include in your dashboard to two or three. If you add too many views, visual clarity and the big picture can get lost in the details. If you find that the scope of your story needs to grow beyond two or three views, you can always create more dashboards.

Too many views can also interfere with the performance of your dashboard. See Make Visualizations Faster in the Tableau Desktop help for more details.
Click the image to replay it.

Be security-savvy

A dashboard can include more than just views, it can include objects—including embedded web pages. If you include web page objects in your dashboard, here are some tips to keep in mind:

- **HTTPS:** When you add a web page object to your dashboard, you’re prompted to specify a URL. It’s a best practice to use HTTPS (https://) in your URL. This ensures that the connection from your dashboard to the web page is encrypted. Also, if Tableau Server is running HTTPS and you use HTTP in the URL, your users’ browsers won’t be able to display the web page that the URL points to. If you don't specify a protocol, HTTP will be assumed.
- **Plug-ins:** If the web page object requires a plug-in, such as Adobe Flash, the plug-in must be installed on the computer that’s running Tableau. The Tableau component that handles plug-ins requires that Safari be installed as well.
Add interactivity to encourage exploration

Enable highlighting

You can use the **Highlight** button on the toolbar to set up highlighting between views. When highlighting is turned on, a selection in one view will highlight related data in the other views. You can turn on highlighting for all fields or select specific fields. For more information about the different methods you can use to highlight data, see *Highlight Actions*.

Save time

Use the Go to Sheet command

The views in a dashboard are connected to the worksheets they represent. Tableau provides short-cut menus to help you quickly accomplish basic tasks, like jumping from the dashboard you’re working on to the original view, where you can perform other actions.

To jump to a sheet:

1. In your dashboard, select the view you want to go to.

2. Select **Go to Sheet**.
Hide sheets as you go

When you’re working with a large number of worksheets to build dashboards, as you finish off a dashboard, you can hide the sheets that went into the dashboard. This can make your workbook easier to navigate.

To hide a dashboard’s sheets, right-click (control-click on Mac) the dashboard’s tab at the bottom of the workbook and select **Hide All Sheets**.
Create a Dashboard

After you’ve created one or more views as described in Build Views on the Web, you can pull them into a dashboard, add interactivity, and much more. This article walks you through the steps.

In this article

- Open a dashboard sheet
- Add views
- Add objects
- Add interactivity
- Edit a dashboard
Open a dashboard sheet

You create a dashboard in much the same way you create a new worksheet. After you create a dashboard you can add views and objects.

To open a new dashboard sheet and start creating a dashboard, click the New Dashboard icon at the bottom of the workbook:

The Dashboard area appears on the left and lists the sheets in your workbook.

Add views

After you have a dashboard sheet, click the views you built (listed under Sheets on the left) and drag them to your dashboard sheet on the right. A gray, shaded area indicates where you can drop views:

Click the image to replay it.
Add objects

In addition to adding views to your dashboard, you can add objects, including web pages, blank space, and layout containers. If you’re using Tableau Desktop you can also add text and image objects.

Layout containers are helpful for fine-tuning how your dashboard resizes itself when users interact with it. See Refine Your Dashboard for tips on when and how to use layout containers.

To add an object:

Select an item under **Objects** on the left and drag it to the dashboard sheet on the right:

![Objects selection](image)

Depending on the object you’re adding, you may be prompted for additional information. If you are adding a Web Page object, see Best Practices for Effective Dashboards for tips on web view security options. Also, some web pages don't allow themselves to be embedded—Google is one example.

Add interactivity

Part of the power of dashboards is that you can set up filters and interactivity to associate the different views on your sheet and enhance your users' analysis. The people looking at your dashboard can stay in a single spot—they don't need to click outside the world you've created for them.
In a dashboard you can use the **Use as Filter** option to make one of the views act as a filter on all the other views in the dashboard. To do this, select the filter button.

You can also select the drop-down arrow and choose **Use as Filter**.

**Edit a dashboard**

On the Views page, you can open a dashboard for editing in the following ways:

- In list view, select the check box for the dashboard, then select **Actions > Edit Sheet**.
- Click a dashboard to open it, and then click **Edit**.
**Note:** If you don’t see the **Edit** option, ask the content owner or your administrator for web editing permissions.

Although it’s possible to edit a workbook that has device layouts, it’s not advised. Because device layouts inherit their content, formatting, and action from the parent (that is, from the default dashboard), editing the default dashboard can impact a device layout. You’ll be able to see any issues in a device layout, but because device layouts are read-only, you won’t be able to edit it. To edit a dashboard that has device layouts, download the dashboard to Tableau Desktop and make your edits there.

**Notes**

- When you save your work, even though you may have entered the authoring environment from a single view, the complete workbook is saved, including any other views and dashboards you may or may not have edited.
- The Save options available to you will vary depending on your permissions.

**Refine Your Dashboard**

After you’ve created your dashboard, take a moment to step back and evaluate it. This topic lists some areas to check and refine.

**Is everything in the right spot?**

- Confirm placement
- Check label orientation and readability

**Review sizing and layout**

- Test your work and adjust sizing
- Use a layout container
- Buy space with a floating layout

**Highlight the essentials**

- Show just what your users need
- Eliminate clutter
Is everything in the right spot?

Confirm placement

Make sure that the view with your key finding or main question spans or occupies the upper-left corner of your dashboard. In your views, the most important data should be on the X or Y axis and your less important data should be on color, size, or shape.

Check label orientation and readability

Important labels should be horizontal so that your viewers can easily read them.
Review sizing and layout

Test your work and adjust sizing

Once you finish your dashboard, it's a best practice to test it and experience it as your users will. For example, will they be using Tableau Reader on a laptop to view your dashboard, will the dashboard be published on Tableau Server, or will it be embedded in a web application and viewed from a tablet?

After you test your dashboard, you'll probably find some things to change—sizing and how and where items are positioned are usually among them.

Tableau dashboards are set to a fixed default size that's intended to work well on a typical desktop. However, when you publish (to the web, in a blog, for a presentation, etc.) you may find yourself more limited.
You can specify the overall size of the dashboard using the settings under **Size** in the **Dashboard** area on the left. Select a new size using the drop-down menu.

- **Automatic** - The dashboard automatically resizes to fill the window it's displayed in.
- **Fixed size** - The dashboard always remains a specific size. If the dashboard is larger than the window the dashboard becomes scrollable.
- **Range** - The dashboard scales between minimum and maximum sizes that you specify, after which scroll bars or white space display.

Use a layout container

A layout container can create a smoother experience for your users by helping dashboard objects reposition and resize when one view is filtering another.

The image below shows how a dashboard behaves when two views are placed in a vertical layout container versus how they behave when they are not placed in a layout container. Notice how, in the dashboard that uses a layout container, the views adjust vertically as different filters are applied.
Click the image to replay it.

To add a layout container
1. Drag a horizontal or vertical layout container to the dashboard.

2. Add sheets and objects to the layout container. As you hover over the layout container, a blue box indicates that the object is being added to the flow of the layout container.
Buy space with a floating layout

Tableau uses a tiled layout by default in dashboards, which means that each view, legend, and object is arranged in a single-layer grid, similar to a tiled floor.
If you want an item to overlap another, you can use a **Floating** layout for one or more items instead:

Legends can sometimes be floated over other items instead of remaining tiled.

See Resize and Lay Out Your Dashboard for more details.
Highlight the essentials

Show just what your users need

Legends, titles, captions, and filters can be helpful for your viewers. Make sure you give your users what they need and no more.

To change what's displayed for your users:

1. Select a view in the dashboard.

2. Click the drop-down menu in the upper-right corner of the selected view and select the items you want to show. For example, you can show the title, caption, legends, and a variety of filters.
Note: You can display or hide a dashboard title on the web, but you can't edit it.

Note: Filters are only available for the fields used in the original view.

Eliminate clutter

In general, you should try to use no more than two color palettes in a single dashboard, and ideally, just one palette if your data is quantitative. Remove unnecessary text, lines, or shading that don't provide actionable information for your viewers. Make sure every legend you provide is really needed, remembering to take into account the final, published size of your dashboard.
Click the image to replay it.

**Resize and Lay Out Your Dashboard**

After you create a dashboard, you might need to spend some time resizing it and reorganizing its contents so that it works for your users. This topic walks you through the different approaches you can take and gives you tips on when to use each.
Control overall dashboard size

- Dashboard size options
- Set overall dashboard size

Group items using layout containers

- Layout container types
- Add a layout container
- Format a layout container

Layer or tile individual items

- Tiled versus floating layouts
- Assign a tiled or floating layout to a new item
- Assign a floating layout to an existing Item

Size, position, and reorder individual items

- Set an item’s size and position

Control overall dashboard size

Dashboard size options

Here are the settings you can use for controlling the overall size of a dashboard:

**Fixed size (default):** The dashboard remains the same size, regardless of the size of the window used to display it. If the dashboard is larger than the window, it becomes scrollable. You can pick from a preset size, such as Desktop Browser (the default), Small Blog, and iPad.

This setting allows you to specify the exact location and position of objects, which can be useful if there are floating objects in the dashboard. Select this setting if
you know the size at which your dashboard will be displayed, and it's a single size.

Published dashboards that use a fixed size can load faster than dashboards with variable sizes because they're more likely to be loaded directly from the server cache versus needing to be freshly rendered for every browser request.

**Range:** The dashboard scales between minimum and maximum sizes that you specify. If the window used to display the dashboard is smaller than the minimum size, scroll bars are displayed. If it's larger than the maximum size, white space is displayed.

Use this setting when you're designing for two different display sizes that need the same content and have similar shapes—such as small browser windows and medium browser windows. It also works well for mobile dashboards with vertical layouts, where the width may change to account for different mobile device widths, but the height is fixed to allow for vertical scrolling.

**Automatic:** The dashboard automatically resizes to fill the window used to display it.

Use this setting if you want Tableau to take care of the resizing.

For best results with this setting, place views and objects in the dashboard using a **Tiled** layout.
Set overall dashboard size

To set the overall size of a dashboard:

- Under **Size** on the Dashboard pane, select the dashboard's dimensions (such as **Desktop Browser**) or sizing behavior (for example, **Automatic**).

Group items using layout containers

A layout container is an optional way to keep views and objects together. It helps groups of items resize and change position when users interact with your dashboard so that the dashboard doesn't include white space that you don't want.
The image below shows how a dashboard behaves when two views are placed in a vertical layout container versus how they behave when they are not placed in a layout container. Notice how, in the dashboard that uses a layout container, the views adjust vertically as different filters are applied.
Layout container types

A horizontal layout container resizes the width of the views and objects it contains; a vertical layout container adjusts height.

**Horizontal layout container**

The two views below are in a horizontal layout container.

**Vertical layout container**

The three views below are stacked in a vertical layout container.

Add a layout container

To add a layout container to a dashboard:

1. Under **Objects** on the Dashboard pane, select **Horizontal** or **Vertical**.
2. Drag the container to the dashboard.
3. Add views and objects to the layout container.
Layer or tile individual items

Tiled vs. floating layouts

Each object and view that you place on a dashboard has a layout attribute, either tiled (the default) or floating.

**Tiled layout**

When a view or object is placed with this attribute, it becomes part of a single-layer grid that resizes based on the overall dashboard size. Tiled items don't overlap one another.

**Floating layout**

Items placed with this attribute can be layered on top of other objects. In the graphic below, every view is tiled except for the map view, which is floating.
For best results, give floating objects and views a fixed size and position.

Layout containers can also be floating or tiled. For example, you may have a group of key performance indicators that you want to float over a view in your dashboard. Putting them in the same layout container keeps them together, and floating them as a group saves space. If you do make a floating layout container, the items within it must be tiled.

Assign a tiled or floating layout to a new item

To assign a tiled or floating layout to a view or object that isn't already in your dashboard:

1. Before you drag the view or object onto your dashboard, under Objects in the Dashboard pane, click the layout option you want to use: **Floating** or **Tiled**.
2. Drag the view or object onto the dashboard on the right.

**Tip:** You can also assign a floating layout to an item by holding down **Shift** on your keyboard as you drag it onto the dashboard.

Assign a tiled or floating layout to an existing item

To switch an item that's already in your dashboard from **Tiled** to **Floating**:

1. Select the item in the dashboard.

2. In the item's shortcut menu, select **Floating**:
Size, position, and reorder individual items

If you want a high degree of control over the size and position of every item in a dashboard, and if you're also using **Fixed size** or **Range** for overall dashboard sizing, use the settings on the Layout pane. This is where you can control an object or view's exact position, size, and other characteristics.
Set an item's size and position

1. Select the dashboard item you want to position and size. The item's name appears under **Selected item**.

2. Define the item's position $x$ and $y$ position in pixels as an offset from the top left corner of the dashboard.

   For example, to place an object in the top left corner of the dashboard, specify $x = 0$ and $y = 0$.

   ![Dashboard and Layout Panel](image)

   The values you enter can be positive or negative and must be whole numbers.

3. To resize an item, click and drag it in the dashboard. You can also use the settings under **Size**.

4. To hide the title of the item you have selected, clear the **Show title** check box. The **Show dashboard title** check box on the Dashboard pane controls just the dash-
Work in the Web Authoring Workspace

The web authoring workspace in Tableau Server is a lot like Tableau Desktop. You can create and edit views and dashboards in your workbook, but not stories.

To enter the web authoring workspace, click Edit in the toolbar. If you don't see this option, ask the content owner or your administrator for web editing permissions.

**Note:** Only the workbook owner can save changes to an existing workbook on Tableau Server or Tableau Online.

Worksheets
Like in Tableau Desktop, **Data** and **Analytics** panes appear on the left side of the workspace.

The **Data** pane includes the names of the data sources included in the workbook, and the fields, parameters, and sets included in the active data source.
The **Analytics** pane provides analytic features in Tableau. You can drag reference lines, forecasts, trend lines, and other objects into your view from the **Analytics** pane.
The main menu and a toolbar with options for editing the view appears at the top of the workspace. For details about the toolbar options, see Web Authoring Toolbar.

The **Marks** card and the **Pages** and **Filters** shelves appear on the left of the view. **Columns** and **Rows** for measures and dimensions shelves appear above the view. **Tabs** for worksheets and dashboards in the workbook appear at the bottom of the workspace.

To create a new view, click the **New Worksheet** button at the bottom of the workspace, or on the toolbar, click the drop-down arrow on the **New Worksheet** button and select **New Worksheet** from the list.

**Dashboards**

Select a dashboard tab in your workbook, and then click **Edit** in the toolbar to begin authoring. You can interact with dashboards as you would in Tableau Desktop. For more
information, see Create Views and Dashboards.

**Note:** If you don’t see the **Edit** option, ask the content owner or your administrator for web editing permissions.

For example, sort data by selecting the sort button next to a view name on your dashboard. Or, select field names to **Keep Only**, **Exclude**, **View Data**, or **Group Members**. These actions affect associated underlying worksheets.
To easily update or review views in your workbook, select a view on your dashboard then click the **Go to Sheet** icon.

### Ease of Business

![Correlation Between Ease of Business and GDP Per Capita](image)

**Toolbar Menus**

To create a new dashboard, on the toolbar, click the drop-down arrow on the **New Worksheet** button and select **New Dashboard** from the list or click the dashboard button at the bottom of the workspace.

To rename an existing dashboard, double-click the tab for the dashboard and type a new name.

Use the **Download** menu to save your dashboard for offline viewing or to download underlying data.

Select **Download > Image** to save your dashboard as a PNG file. Select **Download > PDF** to save your dashboard as a PDF.
To download a view's underlying data, first select the view on your dashboard. The context-sensitive Download menu updates to add the options **Data** and **Crosstab**.

Select **Data** to open a new window where you can preview and download both summary and underlying data for the view you've selected.

Select **Crosstab** to download summary data for the view you've selected as a text table (CSV file).

**Web Authoring Toolbar**

When you are creating or editing a view, you can use the toolbar at the top of the view to perform common actions. The table below explains the function of each toolbar button.

<table>
<thead>
<tr>
<th>Toolbar Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>←</td>
<td><strong>Undo</strong>: Reverses the most recent action in the workbook. You can undo an unlimited number of times, back to the last time you opened the workbook, even after you have saved.</td>
</tr>
<tr>
<td>→</td>
<td><strong>Redo</strong>: Repeats the last action you reversed with the <strong>Undo</strong> button. You can redo an unlimited number of times.</td>
</tr>
<tr>
<td>![icon]</td>
<td><strong>New Data Source</strong>: Opens the <strong>Connect to a Data Source</strong> page, where you can connect to a published data source. For more</td>
</tr>
<tr>
<td>Toolbar Button</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>📚</td>
<td>information, see Connect to Published Data Sources.</td>
</tr>
<tr>
<td>⏳️</td>
<td><strong>Pause Auto Updates</strong>: Controls whether Tableau updates the view in real time when changes are made. For more information, see Refresh Data or Pause Automatic Updates.</td>
</tr>
<tr>
<td>📋</td>
<td><strong>New Worksheet</strong>: Creates a new blank worksheet or dashboard. For more information, see Create Views and Dashboards.</td>
</tr>
<tr>
<td>🥤</td>
<td><strong>Duplicate Sheet</strong>: Creates a new worksheet or dashboard containing the same view as the current sheet.</td>
</tr>
<tr>
<td>🌋</td>
<td><strong>Clear</strong>: Clears the current worksheet or dashboard. Use the drop-down menu to clear the entire sheet or just the sheet formatting.</td>
</tr>
<tr>
<td>🔍️</td>
<td><strong>Swap</strong>: Moves the fields on the <strong>Rows</strong> shelf to the <strong>Columns</strong> shelf and vice versa. Most used with view types that are based on x- and y-axes.</td>
</tr>
<tr>
<td>∑️</td>
<td><strong>Totals</strong>: You can compute grand totals and subtotals for the data in</td>
</tr>
<tr>
<td>Toolbar Button</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>a view. Select from the following options:</td>
<td></td>
</tr>
<tr>
<td>• <strong>Show Column Grand Totals</strong>: Adds a row showing totals for all columns in the view.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Show Row Grand Totals</strong>: Adds a column showing totals for all rows in the view.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Row Totals to Left</strong>: Moves rows showing totals to the left of a crosstab or view.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Column Totals to Top</strong>: Moves columns showing totals to the top of a crosstab or view.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Add All Subtotals</strong>: Inserts subtotal rows and columns in the view, if you have multiple dimensions in a column or row.</td>
<td></td>
</tr>
<tr>
<td>• <strong>Remove All Subtotals</strong>: Removes subtotal rows or columns.</td>
<td></td>
</tr>
<tr>
<td><strong>Highlight</strong>: Turn on highlighting for</td>
<td></td>
</tr>
<tr>
<td>Toolbar Button</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>the selected sheet. Use the options on the drop-down menu to define how values are highlighted. For more information, see <a href="#">Highlight Marks, Legends &amp; Actions</a>.</td>
</tr>
<tr>
<td>![T]</td>
<td><strong>Show Mark Labels</strong>: Switches between showing and hiding mark labels for the current sheet.</td>
</tr>
<tr>
<td>![Format Workbook]</td>
<td><strong>Format Workbook</strong>: Open the Format Workbook pane to change how fonts and titles look in every view in a workbook by specifying format settings at the workbook level instead of at the worksheet level.</td>
</tr>
<tr>
<td>![Fit]</td>
<td><strong>Fit</strong>: Change the proportions of your view within the browser window, and go back and forth between seeing details and seeing the whole picture. The <strong>Cell Size</strong> commands have different effects depending on the type of visualization.</td>
</tr>
<tr>
<td>![Show/Hide Cards]</td>
<td><strong>Show/Hide Cards</strong>: Shows and hides <strong>Titles, Captions, Filter</strong>, and <strong>Highlighter</strong> cards that are included in the view.</td>
</tr>
<tr>
<td>![Download]</td>
<td><strong>Download</strong>: Use the options under <strong>Download</strong> to capture parts of your</td>
</tr>
<tr>
<td>Toolbar Button</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Image</strong></td>
<td>Displays the view, dashboard, or story as an image in a new browser tab.</td>
</tr>
<tr>
<td><strong>Data</strong></td>
<td>Displays the data from the view in a new browser window with two tabs: Summary, showing aggregated data for the fields shown in the view, and Underlying, showing underlying data for the selected marks in the visualization. If the new window does not open, you may need to disable your browser's popup blocker.</td>
</tr>
<tr>
<td><strong>Crosstab</strong></td>
<td>Saves the underlying data for the selected marks in the visualization to a CSV (comma-separated values) file which can then be opened in Microsoft Excel.</td>
</tr>
<tr>
<td><strong>PDF</strong></td>
<td>Opens the current view as a PDF in a new browser window. From there you can save it to a file. If the new window does not open, you may need to disable your browser's popup blocker.</td>
</tr>
<tr>
<td><strong>Show Me</strong></td>
<td>Opens a control that...</td>
</tr>
<tr>
<td><strong>Toolbar Button</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>shows a range of visualization types that you can use in Tableau. When you display the Show Me list, Tableau uses the data in the current view to determine which visualization types to make available for you to select. Among the available types, it draws an orange outline around the recommended chart type that is the best match for your data. You can also hover over a visualization type to see what field types are required to make that visualization type available.</td>
</tr>
</tbody>
</table>

**The Side Bar**

The Side Bar provides two panes: the Data pane and the Analytics pane.

You can hide and show the Side Bar by clicking the minimize button in the upper right corner. The Data pane collapses to the bottom of the workbook. Click the minimize button again to show the Data pane.

To open the Side Bar again click the same button, which is now at the extreme left of the workspace:
Edit Views on the Web: Data Pane

At the top of the Data pane is a list of available data sources for the workbook. If you are editing an existing workbook, there may be multiple data sources. If you are creating a new workbook, you see only the data source from which you created the workbook.

Select a data source to see the dimensions and measures for that data source.

All data sources contain fields. These fields appear below the list of data sources in the Data pane. Dimensions and measures always appear, other field types appear if they exist in the data source:

- **Dimensions** are fields that contain discrete qualitative data. Examples of dimensions include dates, customer names, and customer segments.

- **Measures** are fields that contain numerical data that can be aggregated. Examples of measures include sales, profit, number of employees, temperature, frequency, and pressure.

- **Sets** are custom fields that define a subset of data based on some conditions. A set may be based on a computed condition, which updates as the data changes, or a constant list of values. Sets may exist in workbooks that you edit, but you cannot create sets.

- **Parameters** are dynamic values that can replace constant values in calculations,
filters, and reference lines. Parameters may exist in workbooks that you edit, but you cannot create parameters.

By default, Tableau treats all relational fields containing numbers as measures. However, you might decide that some of these fields should be treated as dimensions. For example, a field containing ages may be categorized as a measure by default in Tableau because it contains numeric data. However, if you want to look at each individual age rather than an axis, you can convert the Age field to a dimension. To do this, drag the Age measure and drop it into the Dimensions area in the Data pane. Now if you drag the Age field to the Rows or Columns shelf it will create column headers (1, 2, 3, etc.) instead of a continuous axis.

To build visualizations, you drag fields from the Data pane to the Rows and Columns shelves, the Marks card, or one of the other available shelves. For a demonstration, see Build Views on the Web.

Manage fields in the Data pane

Right-click a field in the Data pane to see a set of options for modifying that field. You can do the following:

- Convert a dimension to a measure or vice versa.
- Convert a discrete field to continuous or vice versa. This option is available for measures and date dimensions.
- Change the data type for a field.
- Change the geographic role for a field.
- Change the default aggregation for a measure.
- Create a calculated field.

Data blending

If you upload a workbook that uses blended data sources, you can see a link next to the field or fields in the primary data source that are being used to link the two data sources:
You can click on the link icon to activate or deactivate specific fields. When fields that can be used as linking fields are not being used, the link icon changes to show a broken link:

Data sources are linked using a left join, where the view is using all data rows from the primary data source but only those data rows from the secondary data source that have values for fields that are in the view or for fields that are designated as linking fields. So changing the linking field, or designating multiple linking fields, can actually pull in different or additional data rows from the secondary data source, thereby changing the values returned by aggregations.

Analytics Pane

The Analytics pane provides quick and easy access to common analytic features in Tableau. You can drag reference lines, box plots, trend lines forecasts, and other items into your view from the Analytics pane, which appears on the left side of the workspace. Toggle between the Data pane and the Analytics pane by clicking one of the tabs at the top of the Side Bar:
Add Analytics Pane Item

To add an item from the **Analytics** pane, drag it into the view. When you drag an item from the **Analytics** pane, Tableau shows the possible destinations for that item. The range of choices varies depending on the type of item and the current view.

In a simple case, the drop target area would offer these three options:
The terms **Table**, **Pane** and **Cell** define the scope for the item:

For a more complicated view—for example, if the view contained a line chart with multiple or dual axes—Tableau would show you a drop target area that looked like this:
If you dropped the item in one of the three larger boxes in the header at the top of the drop target area—for example, the Table box—a separate median with quartiles would be added for each axis:

![Graph showing median with quartiles]

But if you drop the item in any of the six lower boxes aligned with a specific measure, the median with quartiles would only be added on the corresponding axis, with the specified scope.

**Delete Analytics Pane Item**

You can delete an item you just added from the Analytics pane by clicking the Undo button.
on the web editing toolbar. See Web Authoring Toolbar.

You can also click on an item and choose Remove from the tooltip.

**Note:** Some Analytics pane items (Median with Quartiles and Average with 95% CI) actually add both a reference line and a reference distribution. Unless you are using Undo, you would need to delete these items separately.

**Edit Analytics Pane Item**

For information on how to edit an Analytics pane item, see the section for a particular item type under Analytics Pane Item Definitions, below.

**Analytics Pane Items**

The following items can be dragged from the **Analytics** pane and dropped in the view.

**Constant Line**

Adds one or more constant lines to the view. You can add a constant line for a specific measure, for all measures, or for date dimensions. When you add a constant line, Tableau displays a Value prompt where you specify the value for the constant:

<table>
<thead>
<tr>
<th>Value:</th>
<th>26,329,992,559,1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

Click on a constant line to change its value or to remove it. You can also click the **Undo** button on the web editing toolbar to remove the line. See Web Authoring Toolbar.

**Average Line**

Adds one or more average lines to the view. You can add an average line for a specific
measure or for all measures.

You can click on a resulting average line and choose a different aggregation, such as Total or Sum, or choose to remove the line entirely. You can also click the **Undo** button on the web editing toolbar. See Web Authoring Toolbar.

**Median with Quartiles**

Adds one or more sets of median lines and distribution bands to the view. You can add a median with quartiles for a specific measure or for all measures.

The distribution bands are computed as quartiles; the middle two quartiles are shaded.

To remove the median and the quartiles, click the **Undo** button on the web editing toolbar. See Web Authoring Toolbar. You can also click on either the median line or the quartiles to see its value or to remove it. You must click on the outer edge of a distribution band to see the options--clicking in the middle of the band has no effect.

**Box Plot**

Adds one or more box plots to the view. You can add box plots for a specific measure or for all measures. The scope for a box plot is always **Cell** (and never **Table** or **Pane**).

Click or hover over any of the horizontal lines in the box plot to see statistical information about the whiskers, quartiles, and median.

Clicking a horizontal line also shows a **Remove** option. You can also click the **Undo** button on the web editing toolbar. See Web Authoring Toolbar.

**Totals**

Adds totals to the view. When you add totals, the drop options are **Subtotals**, **Column**
Grand Totals, and Row Grand Totals.

To remove totals, click the relevant column or row header and choose Remove. You can also click the Undo button on the web editing toolbar. See Web Authoring Toolbar.

Average with 95% CI

Adds one or more sets of average lines with distribution bands; the distribution bands are configured at a 95% confidence interval. You can add these items for a specific measure or for all measures.

The confidence interval distribution bands shade the region in which the population average will fall 95% of the time.

To remove the average line and confidence interval, click the Undo button on the web editing toolbar. See Web Authoring Toolbar. You can click on a resulting average line and choose a different aggregation, such as Total or Sum, or choose to remove the line entirely. You can also click on a distribution to see its value or to remove it. You must click on the outer edge of a distribution band to see the options--clicking in the middle of the band has no effect.

Median with 95% CI

Adds one or more sets of median lines with distribution bands; the distribution bands are configured at a 95% confidence interval. You can add these items for a specific measure or for all measures.

The confidence interval distribution bands shade the region in which the population median will fall 95% of the time.

To remove the median line and confidence interval, click the Undo button on the web editing toolbar. See Web Authoring Toolbar. You can click on a resulting median line and choose a
different aggregation, such as Total or Sum, or choose to remove the line entirely. You can also click on a distribution to see its value or to remove it. You must click on the outer edge of a distribution band to see the options—clicking in the middle of the band has no effect.

**Trend Line**

Adds one or more trend lines to the view. When you add trend lines, the drop options identify the trend line model types available in Tableau: **Linear**, **Logarithmic**, **Exponential**, and **Polynomial**. For some views, only a subset of these options is available.

Click on a trend line to remove it or to see a statistical definition. You can also click the **Undo** button on the web editing toolbar. See Web Authoring Toolbar.

**Reference Line**

You can add reference lines for a specific measure or for all measures in the view.

After you drag a reference line from the **Analytics** pane and drop it on a target, Tableau automatically opens the Edit Line dialog box. See Adding Reference Lines for information on the available options. Click on an existing reference line to edit it or to remove it. You can also click **Undo** on the web editing toolbar to remove a line that you just added. See Web Authoring Toolbar.

**Reference Band**

You can add reference bands for a specific measure or for all measures in the view.

After you drag a reference band from the **Analytics** pane and drop it on a target, Tableau automatically opens the Edit Band dialog box. See Adding Reference Bands for information on the available options. Click on a reference band to edit it or to remove it. You must click on the outer edge of a reference band to see the options—clicking in the middle of the band has no effect.
no effect. You can also click **Undo** on the web editing toolbar to remove bands that you just added. See Web Authoring Toolbar.

**Edit Views on the Web: Columns and Rows Shelves**

Drag fields to the **Columns** shelf to create the columns of a table, or to the **Rows** shelf to create the rows of a table. You can drag multiple fields to either shelf.

Discrete values (typically, dimensions) appear in blue on the **Columns** and **Rows** shelves; continuous values (typically, measures) appear in green.

At the right end of any field you place on the **Columns** or **Rows** shelf is a drop-down menu that you can use to configure the dimension or measure:

![Field Configuration Menu]

The options available depend on the type of field. The complete list of options includes:
• **Show Filter**

Choose this option to add a filter for this field to the view so that users can specify which data to include and exclude for this dimension or measure.

• **Include in Tooltip**

By default, all fields on the **Columns** and **Rows** shelves are included in the tooltips that appear when you move your mouse over one or more marks in the view. Clear this option to remove a field from tooltips.

• **Discrete/Continuous**

Use these options to convert a continuous range of values into a set of discrete values, or a discrete set into a continuous range.

• **Dimension/Attribute/Measure**

Use this range of options to convert a dimension to a measure or a measure to a dimension.

You can also define the field as an Attribute, which returns the value of the given expression if it only has a single value for all rows in the group, and otherwise displays an asterisk (\(^*\)) character. Null values are ignored.

• **Edit in Shelf**

Use this option to edit the calculated field directly on the shelf. For more information about editing calculated fields, see Create or Edit a Calculated Field.

• **Add Table Calculation**

Opens the Table Calculation dialog box, where you can apply a calculation that transforms the measure’s values.

• **Quick Table Calculation**
Provides a set of options for redefining the meaning of the marks for the value.

- **Remove**

Removes the value from the **Columns** or **Rows** shelf.

**Options for Date Dimension**

An additional set of options is available for date dimensions:

<table>
<thead>
<tr>
<th>Year</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quarter</strong></td>
<td>Q2</td>
</tr>
<tr>
<td><strong>Month</strong></td>
<td>May</td>
</tr>
<tr>
<td><strong>Day</strong></td>
<td>8</td>
</tr>
<tr>
<td>More</td>
<td>▼</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quarter</strong></td>
<td>Q2 2015</td>
</tr>
<tr>
<td><strong>Month</strong></td>
<td>May 2015</td>
</tr>
<tr>
<td><strong>Week Number</strong></td>
<td>Week 5, 2015</td>
</tr>
<tr>
<td><strong>Day</strong></td>
<td>May 8, 2015</td>
</tr>
<tr>
<td>More</td>
<td>▼</td>
</tr>
</tbody>
</table>

Choose one of the options from the upper group to define the granularity of the data as discrete values. For example, if you choose **Month** your view will combine the data for each named month in your data across the full range of years:
There are exactly twelve marks in the data--one for each month. The November mark combines the data from November 2008, November 2009, etc.

Choose one of the options from the lower group to define the granularity of the data as continuous values. For example, if you choose Month your view will show your data sequentially, over the range of available months.
In this case there are 48 marks in the data—one for each month since November 2008.

Marks

When you drag fields to the view, the data are displayed using marks. Each mark represents the intersection of all of the dimensions in the view. For example, in a view with Region and Year dimensions, there is a mark for every combination of those two dimensions (East 2011, East 2012, West 2011, West 2012, etc.).
Marks can be displayed in many different ways including lines, shapes, bars, maps, and so on. You can show additional information about the data using mark properties such as color, size, shape, labels, etc. The type of mark you use and the mark properties are controlled by the Marks card. Drag fields to the Marks card to show more data. For example, the same view above is shown again below but this time with Profit on Color. With this additional information, it is clear that the West region had the highest profit in 2014.

Control the marks in the view using the Marks card. Use the drop-down menu to specify the type of mark to show. Drag fields to the Marks card and use the drop-down controls to add more information to the view and control the color, shape, size, labels, and number of marks in the view.

**Edit Views on the Web: Filters Shelf**

Use the Filters shelf to specify which data to include and exclude for a dimension or measure. For example, you might want to analyze the profit for each customer segment, but only for certain shipping containers and delivery times. By placing the Container dimension on the Filters shelf you can specify which containers to include. Similarly, you can put the Delivery Date field on the Filters shelf to define which delivery times to include.

When you drag a dimension or measure to the Filters shelf, Tableau inserts a filter control into the view so users can select the values to display. For example:
For dimensions, the filter control shows discrete values, as above. For measures, the control shows a continuous range:

Hover your mouse to the right of the title for the filter control to specify how to display values in the control:

Edit Views on the Web: Pages Shelf

Drag a dimension or measure to the Pages Shelf to break a view into a series of pages so you can better analyze how a specific field affects the rest of the data in a view. Dragging a dimension to the Pages shelf is like adding a new row for each member in the dimension.
Dragging a measure to the Pages shelf automatically converts the measure into a discrete measure that can be broken into individual pages.

When you drag a dimension or measure to the Pages shelf, Tableau automatically inserts a control into the view to let you navigate the pages in your view. For example:

You can manually advance through the sequence of pages in any of the following ways:

- Use the drop-down menu to select a value.
- Use the forward and back buttons on either side of the drop-down list to navigate through the pages one at a time.
- Use the Page slider to quickly scroll forward and backward in the sequence of pages.

Select **Show History** to show marks from previous pages in addition to marks for the current page.

**Edit Views on the Web: Tooltips**

Place your cursor over a mark in the view to see the tooltip for that mark.

Tooltips provide information on the values of dimensions and measures for the selected mark:
Tooltips also provide these options:

- **Keep Only**
  
  Exclude all marks from the view except this one.

- **Exclude**
  
  Exclude this mark only.

- **Group Members**
  
  Choose the paperclip icon to create a new group, which is a dimension, from the selected mark. Typically, you would select multiple marks and then create a group. For example, if you have a dimension Region with values North, South, East and West, you could select South and West and then create a group from them.

- **View Data**
  
  Choose the table icon to open a new browser window to display two tabs: **Summary**, which shows only data for the current mark, and **Underlying**, which shows data for the entire view.

**Calculated Fields**

If your underlying data doesn't include all of the fields you need to answer your questions, you can create new fields in Tableau and then save them as part of the data source. For example, you could create a new calculated field called **Profit** that calculates the difference
between the Sales and the Cost fields, or you could create a formula that sorts values for the Sales Budget field depending on whether they are under budget or over budget.

You created calculated fields in Tableau by defining a formula that is based on existing fields and other calculated fields, using standard functions and operators. You can create calculated fields using the calculation editor, or by double-clicking a field on a shelf and building an ad-hoc calculation.

You can create calculated field with Tableau Desktop or in Tableau web editing environments in products like Tableau Server and Tableau Online.

**Note:** You can use all types of calculations if you are using a relational data source, however multidimensional data sources do not support aggregations and binned data.

Create or Edit a Calculated Field

Use the calculation editor to create or modify a calculated field.

**In this topic:**

- Create a Calculated Field
- Edit a Calculated Field
- Drag and Drop Options with the Calculation Editor
- Copy and Paste Calculated Fields
- Named Calculations
- Customize the Calculation Editor
- Visual Feedback in the Calculation Editor
- Sheets Affected
Create a Calculated Field

To open the calculation editor, click the drop down to the right of Dimensions on the Data pane and choose **Create Calculated Field**.

You can also choose **Analysis > Create Calculated Field**.

Click the triangle at the right edge of the editor to open a pane where you can select functions by category or see help for the selected function.

See **Create Formulas in Tableau** for information on how to bring the different element that make up a formula into the calculation editor.

When the workbook is connected to multiple data sources, the current data source is listed next to the calculation name box in the upper left—in the image above, the current data source is **Sample - Superstore**. As you work in the editor, any fields that you that are not from the current data source are shown with the data source prepended to the field name. For example: [DS1].[Sales].

Click **Apply** in the calculation editor to save the field as currently defined and add it to the **Data** pane without closing the editor; click **OK** to save the calculation and close the editor.

Calculations that return a string or date are saved as dimensions, and calculations that return a number are saved as measures.

Tableau will allow you to save an invalid calculation; however, a red exclamation point appears next to it in the **Data** pane:
Until you correct an invalid calculated field, you will not be able to drag it into the view.

Edit a Calculated Field

To edit a calculated field in Tableau Desktop, right-click (control-click on Mac) it in the Data pane and select Edit.

To edit a calculated field on the web, click on the drop-down to the right of the field in the Data pane and select Edit:

You can only edit calculated fields—that is, named fields created in Tableau (as opposed to named fields that were part of the original data source).

Drag and Drop Options with the Calculation Editor

You can work on a calculation in the editor and do other things in Tableau at the same time. Here is an example of the kind of workflow that is possible with the calculation editor:

1. Start by creating or editing a view.

2. Open the calculation editor and begin working on a calculated field.
3. Drag all or part of your formula to a shelf, dropping it on an existing field, to see how it changes the view.

4. Double-click the field you just dropped on the shelf to open it as an ad-hoc calculation (see Ad-Hoc Calculations for details). Then tweak the calculation.

5. Drag the ad-hoc calculation back to the calculation editor and drop it on the original formula in the calculation editor, thereby replacing the original formula.

You can also drag all or part of a formula to the Data pane to create a new field.

As you drag formula content to a shelf, card, or pane, Tableau provides visual feedback:

- A red X indicates that you cannot drop the expression at the current location:

  ![Filters](image)

- If you drop an expression that you have dragged from the calculation editor onto a field in the view, the expression replaces that field. If the resulting expression is not valid, the resulting field will be red. You can then edit the expression to make it a valid field.

- If you drag in a field from a secondary data source, it comes with fully qualified name and default aggregation. For example, with a secondary data source named DS1, here is how fields might appear when dragged into the calculation editor:

  
  ```
  [DS1].[Sales]
  SUM([DS1].[Sales])
  ATTR([DS1].[Customer Name])
  ```

  For purposes of calculations, the primary data source is whichever data source is currently displayed in the Data pane.
It is not possible to drag numeric bins, generated latitude and longitude fields, **Measure Names**, or **Measure Values** into the calculation editor.

**Copy and Paste Calculated Fields**

Calculated fields are available to all sheets that use the same data source in a single workbook. To copy and paste calculated fields between workbooks, right-click the field in the **Data window** of the source workbook and choose **Copy**. Then right-click in the **Data window** in the destination workbook and choose **Paste**. You can copy and paste all custom defined fields, including calculated fields, ad hoc groups, user filters, and sets.

**Named Calculations**

When you use the calculation editor, the result must always be a calculated field—that is, a user-created named field (as opposed to a named field that was part of the original data source). If you are editing an existing calculated field, then that field is updated when you click **OK** or **Apply**. If you are creating a new calculated field, or wish to save your modifications as a new field, type a new field name in the box at the top of the calculation editor before clicking **OK** or **Apply**. Ad-hoc calculations, by contrast, do not need to be named. See Ad-Hoc Calculations.

**Customize the Calculation Editor**

You can customize the calculation editor in the following ways:

- **Resize or move the calculation editor**

  You can resize the calculation editor by dragging from any of its corners (in Tableau Desktop) or by dragging from the lower right corner (in a view on the web).

  You can move the editor by clicking in the upper-left section (anywhere in the box shown in red, below) until you see the four-way arrow cursor (outlined in blue), and then dragging:
In Tableau Desktop, the editor is initially displayed within the view, but you can move it outside the view—for example, to a second monitor. Moving the calculation editor does not move Tableau Desktop, and moving Tableau Desktop does not move the editor.

- **Resize text**

  To increase text size in the calculation editor in Tableau Desktop, hold down the Ctrl key and scroll the mouse button upward. To decrease text size, hold down Ctrl and scroll the mouse button downward. All text in the editor is resized—you cannot resize only selected text. Text size persists until you close the editor. The next time you open the editor, text is at the default size.

Visual Feedback in the Calculation Editor

The calculation editor has built-in coloring and validation to help you avoid syntax errors. As you create a formula, syntax errors are underlined with a red line. Hover over the error to see a suggestion for resolving it:

```
[Profit] SUM([Profit])
```

Feedback on formula validity is also displayed at the bottom of the calculation editor. A green check mark indicates that the formula is valid; a red X indicates that it is not. You can click the drop down box to see details:
When you are writing formulas, any part that displays in bold indicates that it will be computed locally within Tableau on the aggregated results. Any normal weight text will be computed at the database level.

**Note:** If you are connected to a Microsoft Analysis Services data source, the calculation editor contains a "Run before SSAS" check box. Choose this option to execute the Tableau calculation before any Microsoft Analysis Services calculations.

Sheets Affected

As you edit a calculated field, you can click **Sheets Affected** in the editor’s status bar to see which other sheets are using the field, which will be updated when you commit your changes:

The **Sheets Affected** drop-down is only shown if the field you are editing is also being used in other sheets. On the web, this drop-down is named **Affected Sheets**.

Create Formulas in Tableau

You create formulas from the following elements:

- **Functions**

  Click the small arrow on the right side of the calculation editor to display a list of functions and their definitions:
You can also type in the **Enter Text to Search** area to find functions that match the characters that you type. By default all functions are displayed. Certain functions are only available with specific data sources. See **Additional Functions** in the Tableau Desktop help for details. For complete help on Tableau functions and other keywords, see **Functions, Operators, & Data Types** in the Tableau Desktop help.

Click a function in the function list to view a brief description and an example on the right. Double-click a function in the list to include it at the cursor location in the current formula.

Functions are colored light blue in formulas.

**Note:** Autocomplete is available in the calculation editor. For details, see Autocomplete for Formulas.

- **Fields**

  You can incorporate a field in a formula by dragging it from the **Data** pane and dropping it in the calculation editor.
You can also drag a field from a shelf in the view to the calculation editor. The result will not necessarily be the same as when you drag a field from the Data pane. For example, if you drag the Sales field from the Data pane to the calculation editor, this is what you will see:

[Sales]

But if you drag Sales to the Rows shelf and then drag it from there to the calculation editor, the field will have changed as a result of being aggregated in the view:

SUM([Sales])

You may also choose to modify a field on a shelf before dragging it to the calculation editor. For example, if you have dragged Sales to the Rows shelf and then added a quick table calculation to the field, you can drag the modified field to the calculation editor to see how the field is expressed in the Tableau calculation language, and to make further modifications. This is what you might see:

Calculation1

RUNNING_SUM(SUM([Sales]))

You can also drag part or all of an ad-hoc calculation from a shelf to the calculation editor. In addition to the various drag-and-drop options, you can also just type a field name in the calculation editor. Field names that include special characters or spaces must be delimited with square brackets—for example, SUM([Store Profit]). For field names that actually include bracket characters, just type two additional brackets. For example, to specify a field named “Store Profit” you would type [Store
Profit]}; two of the brackets say "include the bracket character in the field name," and the third bracket delimits the field name. For information on ad-hoc calculations, see Ad-Hoc Calculations.

Fields are colored orange in formulas.

- Operators

Type any necessary operators into your formula. All standard operators such as addition (+), subtraction (−), multiplication (•), and division (/) are supported.

Operators are colored black in the formula.

- Parameters

Parameters are placeholder variables that can be inserted into calculations to replace constant values. When you use a parameter in a calculation, you can then expose a parameter control in a view or dashboard to allow users to dynamically change the value.

Parameters are colored purple in formulas.

Note: You cannot create parameters in web editing environments.

- Comments

To add a comment to a calculation, type two forward slash characters into the formula pane.

For example:

Sales * Profit //John’s calculation

In this example //John’s calculation is a comment.
A comment starts at the two forward slashes (//) and goes to the end of the line. A multiline comment can be written by starting each line with two forward slashes (//).

Comments are colored green in the formula.

Auto-Completion for Formulas

As you type a formula, either in the calculation editor or in an ad-hoc calculation, Tableau displays a list of options for completing the formula.

As you scroll the list, using mouse or keyboard, Tableau shows a short description when the current item is a function:

When the current item is a field, set, or bin, and that keyword has a comment attached, that comment will appear as the description.

Click a keyword in the list or press Enter to select it. If the keyword is a function, Tableau displays syntax information when you select it:
As you type, the list of suggested keywords is organized into the following categories, in the following order:

- Functions, dimensions, measures, parameters, sets, and bins that begin with the string you have typed so far, from the current data source, sorted alphabetically.
- Functions, dimensions, measures, parameters, sets, and bins that contain the string you have typed so far, from the current data source, sorted alphabetically.
- If the workbook connects to multiple data sources, dimensions, measures, sets, and bins from the secondary data sources that begin with or contain the string you have typed so far are displayed, sorted by data source and sorted alphabetically within each data source.

Typing certain characters will either turn off auto-completion or cause it to behave differently:

- Auto-completion will not offer suggestions as you type a quoted string.
- Auto-completion will not offer suggestions if you begin by typing a number.
- If you begin by typing an open square bracket, [, auto-completion shows fields, parameters, sets, and bins, but not functions.

Auto-Completion with Multiple Data Sources

If the workbook is using multiple data sources, auto-completion behaves as follows:

- If the selected field is from a secondary source, auto-completion adds the field with its aggregation and fully qualified name. For example:

  \[ \text{ATTR([secondaryDataSource].[sate])} \]

- Matches from secondary sources are only shown if there is an explicit blend relationship set with the currently active sheet.
- Fields that are being used to blend the two data sources are only shown once in the search results (the field shown is from the primary data source).
Ad-Hoc Calculations

Ad-hoc calculations are calculations that you can create and update as you work with a field on a shelf in the view.

Ad-hoc calculations are also known as type-in or in-line calculations.

In this topic:

- Create an Ad-Hoc Calculation
- Multi-Line Ad-Hoc Calculations
- Ad-Hoc Calculations and Aggregation
- Ad-Hoc Calculations for Insight and Experimentation
- Managing Ad-Hoc Calculations

Create an Ad-Hoc Calculation

Double-click on an existing field to start editing.

You can also double-click on an empty shelf or on an empty part of a shelf to create a new calculation.

Type to update the expression, or drag new fields into the expression from the Data pane or elsewhere in the view.
Press Enter or click outside the expression to commit the expression, close the calculation, and update the view.

Press Ctrl+Enter to commit the expression and update the view without closing the calculation.

Ad-hoc calculations are supported on the **Rows, Columns, Marks, and Measure Values** shelves; they are not supported on the **Filters** or **Pages** shelves.

**Note:** Ad-hoc calculations are not named, but are saved when you close the workbook. If you want to save an ad-hoc calculation for use in other workbook sheets, copy it to the **Data** pane. You will be prompted to name the calculation. (On server it just deposits it w/o rename prompt.) Once you name an ad-hoc calculation, it is the same as a calculation you created with the calculation editor, and is available on other sheets in the workbook. See Create or Edit a Calculated Field

Multi-Line Ad-Hoc Calculations

As you’re typing an ad-hoc calculation, you can press Shift+Enter to start a new line. However, only the current line is ever visible in an ad-hoc calculation, so this can be confusing for anyone viewing or editing the calculation who has no way of knowing that it contains multiple lines.

The first line of a multi-line ad-hoc calculation can be a comment that serves as a title for the calculation. This is the only line that is visible on the shelf after the calculation is committed:

```
//City and State
[City] + ', ' + [State]
```
Ad-Hoc Calculations and Aggregation

If Tableau determines that the expression you enter is a measure (that is, returns a number), it automatically adds an aggregation to the expression when you commit the expression. For example, if you type `DATEDIFF('day',[Ship Date],[Order Date])` in an ad-hoc calculation and then press Enter, what you will see is the following:

$$\text{SUM}(\text{DATEDIFF('day',[Ship Date],[Order Date])})$$

If you use a field that is already an aggregated field (for example, `SUM([Profit])`) in an ad-hoc calculation, the result is an aggregate calculation. For example, when you commit an ad-hoc calculation `SUM([Profit])/SUM([Sales])`, the result is:

$$\text{AGG}(\text{SUM}([\text{Profit}])/\text{SUM}([\text{Sales}]))$$

Ad-Hoc Calculations for Insight and Experimentation

Typically you create ad-hoc calculations on-the-fly to do things like

- Test a hunch
- Try a what-if scenario
- Debug a complex calculation

Managing Ad-Hoc Calculations

Use the following keystrokes to manage ad-hoc calculations.

- Double-click in an existing field on the **Rows, Columns, Marks, or Measure Values** shelf to open it as an ad-hoc calculation.
- Double-click elsewhere on any of these shelves to create a new ad-hoc calculation from scratch.
- Press Esc to cancel an ad-hoc calculation.
- Press Enter to commit an ad-hoc calculation, which updates the view and closes the
ad-hoc calculation. Press Ctrl+Enter to commit the change and update the view without closing the ad-hoc calculation.

- When you double-click a named field on a shelf to edit it, you are not changing the original named field.

In addition, the following rules govern the use of ad-hoc calculations.

- Only one ad-hoc calculation can be open at a time.

- If a field that has a geographic role or a fiscal year setting associated with it is added to an ad-hoc calculation, the ad-hoc calculation inherits that role or setting.

- The right-click context menu for an ad-hoc calculation supports the same options that would be available for any other field in the view of the same type, including the ability to change aggregation, show a filter, or format.

- Ad-hoc calculations are not available when you create groups, sets, hierarchies, or parameters.

- Ad-hoc calculations are valid for creating trend lines, forecasts, and reference lines, bands, and distributions.

Transform Values with Table Calculations

A table calculation is a transformation you apply to the values for a measure in the view.

You can use table calculations for a variety of purposes, including:

- Transforming values to rankings

- Transforming values to show running totals

- Transforming values to show percent of total

Table calculations are available as you work with views in Tableau Desktop and also as you edit views in Tableau Server or Tableau Online.
Table calculations are a special type of calculated field that computes on the local data in Tableau. They are calculated based on what is currently in the view and do not consider any measures or dimensions that are filtered out of the view.

**Note:** The “table” is determined by the dimensions in the view—not the tables in your data source. Also, a “table calculation” is an entirely different thing than a calculated field. For information on calculated fields, see Calculated Fields.

Calculation Assistance

Tableau provides visual cues to help you understand the effects of your decisions as you work with table calculations. You can toggle these aides on or off by clicking **Show calculation assistance** in the Table Calculation dialog box.

- **Highlighting** shows you the scope of your calculation by setting off part of the view with a colored background as you change the **Compute Using** option in the Table Calculation dialog box:

  ![Table Calculation Example](image)

  If you select a different mark in the view while the Table Calculations dialog box is still open, highlighting will switch to the partition containing that mark.

- **Running Order Labels** are numbers, displayed in square brackets, that indicate
how the current calculation is moving through a partition. If you have ever used the INDEX() function to help you visualize a table calculation, running order labels provide the same insight.

What is a Table Calculation?

A table calculation is a transformation you apply to the values of a single measure in your view, based on the dimensions in the level of detail.
For any Tableau view, there is a virtual table that is determined by the dimensions in the view. This table is not to be confused with the tables in your data source. Specifically, the virtual table is determined by the dimensions within the “level of detail,” which means the dimensions on any of the following shelves or cards in a Tableau worksheet:

Consider this simple view:
In this view, the dimensions are **Order Date** (with values aggregated up to **YEAR**) on **Columns**, and **Segment** on **Rows**. The individual cells in the table show the value of the **Profit** measure for each combination of **Order Date** and **Segment**. There are four years’ worth of **Order Date** data, and three **Segments**; multiply these numbers to get 12 individual cells, each showing a **Profit** value.

Suppose you want to see not absolute dollar values, but the percentage of the total profit that each of these 12 individual profit values contributes to the total profit, so that when all the cell values are added, they total 100%. To do this, you can add a table calculation. Here’s how you could add a table calculation to show this.

1. You always add a table calculation to a measure in the view. In this case there is only one measure in the view—**SUM(Profit)**—so when you right-click that measure on the Marks card (or Control-click on a Mac) you see two options that mention table calculations:
• Add Table Calculation

• Quick Table Calculation

If you choose Quick Table Calculation, you will see a range of options:

2. **Percent of Total** looks right. Choose that, and the view updates to show
percentages, instead of absolute dollar values:

![Table example](image)

Notice the triangle icon that now appears next to \textbf{SUM(Profit)} on the Marks card:

![Triangle icon](image)

This indicates that a table calculation is currently being applied to this measure.

3. But what about when the view is not a text table? Are table calculations still an option?
They are.

Back up one step (click the Undo button on the toolbar) to remove the quick table calculation.

4. Now use Show Me to change the chart type to horizontal bars:

You might not be as likely to refer to this view as a “table,” but the dimensions in the level of detail are the same, so the view’s virtual table is the same.

5. You can now apply the exact same table calculation as before—right-click SUM (Profit), choose Quick Table Calculation, and then Percent of Total. The view changes to show percentages along the horizontal axis, instead of dollar values:
Note: When you are learning about table calculations, or experimenting with different options, a text table is usually going to provide more intuitive insight than other chart types.

Quick Table Calculations

A quick table calculation is a one-step process where you choose a common table calculation type from a list. Tableau automatically applies the most typical settings for that calculation type.

To apply a quick table calculation, do the following:

1. Click a measure in the view and choose Quick Table Calculation from the context menu.

2. Choose a Calculation type from the sub-menu.

If the results are satisfactory, you’re done. If not, you can continue working with the calculation by clicking the measure again and choosing Edit table calculation.

The list of available quick calculation types does not exactly match the list of default calculation types you see in the Table Calculation dialog box. For example, a Compound growth rate quick table calculation is a Percent Difference From table calculation, but with the Compute compounded rate option selected. If you want to know how any given quick table calculation is defined, add the calculation and then go back and edit it to see how it is configured in the Table Calculation dialog box.

Choose Your Approach to Table Calculations

The easiest way to add a table calculation is to use a quick table calculation. See Quick Table Calculations. But if you need more flexibility than a quick table calculation affords, you can base your calculation on the visual structure of your view, or you can reference the specific dimensions in the view.
Table Calculations: Use the Visual Structure of Your View

When you configure a table calculation using the **Compute Using** options in the Table Calculation dialog box, you define a table calculation using the visual structure of your view.

As you add or edit a table calculation in the Table Calculation dialog box, Tableau highlights the effects of the **Compute Using** options you choose in the view.
For example, a **Table (Across)** calculation moves from left to right across the entire width of the view:

<table>
<thead>
<tr>
<th>Region</th>
<th>2010</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td>Central</td>
<td>$7,306</td>
<td>$12,201</td>
<td>$19,208</td>
<td>($34,893)</td>
</tr>
<tr>
<td>East</td>
<td>$17,023</td>
<td>$4,287</td>
<td>$54,183</td>
<td>($75,536)</td>
</tr>
<tr>
<td>International</td>
<td>$60,022</td>
<td>$99,595</td>
<td>$359,091</td>
<td>($525,164)</td>
</tr>
<tr>
<td>South</td>
<td>$20,821</td>
<td>$11,251</td>
<td>$13,935</td>
<td>($22,633)</td>
</tr>
<tr>
<td>West</td>
<td>$21,013</td>
<td>($205)</td>
<td>$13,010</td>
<td>($19,048)</td>
</tr>
</tbody>
</table>

**Table Calculation**

**Difference in Profit**

**Calculation Type**

- Difference From

**Compute Using**

- Table (across)
- Table (down)
- Table (across then down)
- Table (down then across)
- Pane (across)
- Pane (across then down)
- Pane (down then across)
- Cell

**Specific Dimensions**

- Year of Order Date
- Quarter of Order Date
- Region

At the level

Relative to Previous
A Pane (Down then Across) calculation moves down the first column in a pane, then down the second column in a pane, and so on:
The **Compute Using** approach should be convenient and intuitive for most users because the calculation aligns with what you see in your view.

The list of options under **Compute Using** changes according to the content of your view. For example, if you have only two dimensions in your view (one on Rows and one on Columns), there will be no Pane options because your view is not complex enough for there to be multiple panes—in this case, your entire view is single pane.

**Table Calculations: Reference Specific Dimensions in Your View**

With this approach, you define a table calculation by referencing the dimensions in the view.

Choose **Specific Dimensions** in the Table Calculation dialog box and then select or clear fields in the box below.
To configure a table calculation using specific dimensions, click **Specific Dimensions** and then select one or more dimensions in the box below. You can also drag dimensions up or down in the list to set the sequence for the calculation:
You can still see the effect of your choices in the view, but because the visual structure and the table calculation are not necessarily aligned (as they always are with the Compute Using options), the results can sometimes look a bit exotic. For example:
If you are configuring table calculations using specific dimensions, then you should become familiar with the concepts of addressing and partitioning. See Table Calculations: Addressing and Partitioning.
Table Calculations: Addressing and Partitioning

If you are configuring table calculations using specific dimensions, then you should become familiar with the concepts of *addressing* and *partitioning*.

Background: How Level of Detail Affects the Direction and Scope of Your Calculations

Your view contains marks; these marks are typically aggregated. This means that an individual mark collects data not from a single row in your data source, but from all rows that have the same values for the dimensions in your view.

The number of marks in your view is determined by the view’s level of detail. Dimensions located on any of the shelves or cards highlighted in the following image contribute to the level of detail:
So if your view has **State** and **Segment** on Columns, and **Region** on Rows, then a single mark represents all rows in your data source that share the same value for these three dimensions. For example, one mark would aggregate individual values for rows where the value of State is Indiana, the value of Segment is Consumer, and the value of Region is Central. The measure that Tableau is aggregating—it might be Profit, Sales, or any other measure in the data source—is for you to decide, as is the aggregation itself—it might be Sum, Average or another aggregation.

When you add a table calculation, you must use all dimensions in the level of detail either for partitioning (scoping) or for addressing (direction):

- The dimensions that define how to group the calculation, that is, define the scope of data it is performed on, are called partitioning fields. The table calculation is performed separately within each partition.
• The remaining dimensions, upon which the table calculation is performed, are called addressing fields, and determine the direction of the calculation.

Partitioning fields break the view up into multiple sub-views (or sub-tables), and then the table calculation is applied to the marks within each such partition. The direction in which the calculation moves (for example, in calculating a running sum, or computing the difference between values) is determined by the addressing fields. So when you order the fields in the Specific Dimensions section of the Table Calculation dialog box from top to bottom, you are specifying the direction in which the calculation moves through the various marks in the partition.

When you add a table calculation using the Compute Using options, Tableau identifies some dimensions as addressing and others as partitioning automatically, as a result of your selections. But when you use Specific Dimensions, then it’s up to you to determine which dimensions are for addressing and which for partitioning.

The following example demonstrates how experimenting with the options in the Table Calculations dialog box can help you understand how your calculation is working.

Example - Addressing and Partitioning

In this example, using the Sample – Superstore data source provided with Tableau Desktop, create the following simple view:

1. Drag Order Date and Segment to Columns.
2. Drag State to Rows.
3. Drag Sales to Text.

This gives you a basic view:
4. Click **SUM(Sales)** on the Marks card and then select **Add table calculation** from the context menu.

This opens the Table Calculation dialog box.

Note the yellow highlighting running across the top row of the view. Highlighting shows you exactly how the current **Compute Using** option partitions the view.

5. Set **Calculation Type** to **Running Total**.

6. Click **Specific Dimensions**, the last item in the **Compute Using** list.
The list box below the **Compute Using** list, which lists all the dimensions in the view’s level of detail, is now available for edit:

Any field with a check mark is an addressing field. **Year of Order Date** and **Segment** are checked, so this leaves **State** as the only partitioning field. This configuration
matches Table (Across), which was the Compute Using value that was selected when you clicked Specific Dimensions.

**Note:** You can select any of the Compute Using options and then click Specific Dimensions to see how your selected option translates in terms of specific dimensions.

**Year of Order Date** and **Segment** are both on Columns in the view, so these dimensions define the columns in the view. Notice that the values running from left to right in the view are ascending—the running total increases across the entire width of the view.

But when you get to the second row (Arizona) you enter a new partition, so the calculation restarts.

To gain insight, try changing things up in the list of specific dimensions.

7. Clear the check mark from **Year of Order Date**.

**Year of Order Date** is now a partition field, leaving only **Segment** for addressing. **Year of Order Date** and **State** are both now partitioning fields, which means the partitions are more plentiful—and smaller, because you are using two fields to partition (think “divide up”) the view. There are only three marks per partition now, so as you continue moving left-to-right across the view, you enter a new partition with the fourth value, and the calculation restarts.
By default, marks are highlighted in the first partition in the view. The first headers for these fields are also highlighted—in the current case, 2011 and Alabama.

8. Reselect **Year of Order Date** and then drag **Segment** to the top of the list—above **Year of Order Date**. Highlighting shows that the partition is the same as in the default view, stretching left to right across the entire width of the view. This makes sense because the same two fields—**Segment** and **Year of Order Date**—are used for addressing.

But notice that the values are not the same as in the previous view:

Because you reversed the order in which the fields are listed for **Specific Dimensions**, Tableau computes the running total using values for **Segment** first and then **Year of Order Date**. The arrows in the image show the order in which Tableau is computing the running sum. The logic of the calculation is now somewhat at odds with
the visual alignment of the view, but that is what can happen when you configure a table calculation using **Specific Dimensions**.
Customize How Tableau Sorts the Results of Table Calculations

When you add a table calculation using specific dimensions from your view, you can also customize the way Tableau sorts the values. This option is available for all table calculation types except Rank and Percentile.

With custom sorting, you can sort the results of a table calculation using values from a field in the data source. With **Specific Dimensions** selected in the Table Calculations dialog box, do the following:

1. Click to open the **Specific dimensions** drop-down in the Custom Sort area at the bottom of the Table Calculations dialog box.

2. Click **Custom**.

3. From the drop-down list on the left, choose the field with the values you want to sort
4. From the drop-down list on the right, choose the aggregation you want to use with the field.

5. Specify whether to sort by Descending or Ascending values.

Create a Table Calculation

You can add a table calculation to a measure in the view. To add a table calculation:

1. Click a measure in the view and choose Add table calculation from the field menu.

   Tableau opens the Table Calculation dialog box and also adds highlighting to the view. As you work in the Table Calculation dialog box, highlighting shows the scope and direction of the calculation.

2. Choose a Calculation Type.

   For details on available calculation types, see Table Calculation Types.

   For each calculation type there is a specific set of options for you to consider. For example, for a Difference From calculation, there are two associated fields:
For information on these fields, go to Table Calculation Types, and then click the link for **Difference From Calculation**.

3. To define the table calculation using the visual structure of your view, choose one of the **Compute Using** options.
Alternatively, to define the table calculation by referencing specific dimensions in the view, choose **Specific Dimensions** and then select and order dimensions in the box further down in the Table Calculation dialog box.
For information on these two alternative approaches, see Choose Your Approach to Table Calculations. **Compute Using** is the recommended option for most users.

4. When you are satisfied with your table calculation, click the X in the upper-right corner of the Table Calculations dialog box to close it. Highlighting disappears. To indicate that the field now includes a table calculation, Tableau displays a small triangle next to
the field name. Hover the cursor over this triangle to see a description of the table calculation:

Table Calculation Types

As you add or modify a table calculation, you must choose a calculation type. Each type has a specific set of options.

Table Calculation Type: Difference From

For each mark in the view, a **Difference From** table calculation computes the difference between the current value and another value in the table.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to see by how much values go up or down from month-to-month during the course of each year.

Click for Information on How to Create the Basic View

1. Connect to the Sample - Superstore data source.

2. Click and drag the Order Date field in the Data pane and drag it to the Columns shelf.

   The default date level is YEAR(Order Date).

3. Click and drag Order Date again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose Quarter.
You will see two options named **Quarter**. Be sure to choose the first one.

The field should now read **QUARTER(Order Date)**.

**Note:** If you are creating the view on the web, the menu looks a bit different.

5. Click and drag **Order Date** a third time and drop it on the Rows shelf to the right of **QUARTER(Order Date)**.

6. Click on the right side of the field to open the context menu and this time choose **Month** (again, choose the first of two options named **Month**). The field should now read **MONTH(Order Date)**.

7. Drag **Sales** from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Modify the basic view to show how much values go up or down from month-to-month during the course of each year.

1. Click the **SUM(Sales)** field on the Marks card and then select *Add table calculation*.

2. In the Table Calculation dialog box, verify that **Difference From** is the *Calculation Type*.

   This is the default Calculation Type, so you really shouldn't have to change this field value.

3. Choose **Table (Down)** from the *Compute Using* list.

The highlighting shows how this **Compute Using** value sets the scope of the calculation in the view:

<table>
<thead>
<tr>
<th>Quarter of Order</th>
<th>Month of Order</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>-$9,136</td>
<td>-$5,963</td>
<td>$4,325</td>
<td>-$24,420</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>$50,880</td>
<td>$26,256</td>
<td>$28,319</td>
<td>$33,625</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>-$27,396</td>
<td>-$4,272</td>
<td>-$11,938</td>
<td>-$13,787</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>-$4,647</td>
<td>-$4,064</td>
<td>$17,442</td>
<td>$5,539</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>$10,947</td>
<td>-$5,334</td>
<td>-$17,261</td>
<td>$2,609</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>-$6,649</td>
<td>$3,968</td>
<td>-$990</td>
<td>$169</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>-$6,037</td>
<td>$8,133</td>
<td>-$5,175</td>
<td>$13,088</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>$53,868</td>
<td>$27,698</td>
<td>$39,643</td>
<td>$28,973</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>-$50,324</td>
<td>-$35,191</td>
<td>-$16,445</td>
<td>-$12,695</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>$47,175</td>
<td>$44,568</td>
<td>$25,729</td>
<td>$34,533</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>-$9,083</td>
<td>-$1,053</td>
<td>$15,045</td>
<td>-$21,852</td>
</tr>
</tbody>
</table>

Comparing the values in the original text view with the values in this view, you can
verify that this is the result that you want.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.

**Difference from what?**

With a **Difference From**, **Percent Difference From**, or **Percent From** calculation, there are always two values to consider: the current value, and the value from which the difference should be calculated. In most cases, you want to calculate the difference between the current value and the previous value, as in the procedure above. But in some cases you may want something different:

<table>
<thead>
<tr>
<th>Previous</th>
<th>Calculates the difference between the current value and the previous value in the partition. This is the default value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next</td>
<td>Calculates the difference between the current value and the next value in the partition.</td>
</tr>
<tr>
<td>First</td>
<td>Calculates the difference between the current value and the first value in the partition.</td>
</tr>
<tr>
<td>Last</td>
<td>Calculates the difference between the current value and the last value in the partition.</td>
</tr>
</tbody>
</table>

**At the level**

Use this setting to set a break (that is, restart of the calculation) in the view, based on a particular dimension. How is this different from just using that dimension for partitioning? In fact, it is partitioning, but it’s partitioning by position rather than by value, which is how partitioning is defined with the **Compute Using** options.

The **At the level** option is only available when you select **Specific Dimensions** in the Table Calculations dialog box, and when more than one dimension is selected in the field.
immediately below the Compute Using options—that is, when more than one dimension is defined as an addressing field.

This option is not available when you’re defining a table calculation with Compute Using, because those values establish partitions by position. But with Specific Dimensions, because the visual structure and the table calculation are not necessarily aligned, the At the level option is available to let you fine-tune your calculation.

For example, if you take the result of the Difference From calculation you added above, you can see the effect of At the level by doing the following:

1. Click the SUM(Sales) field on the Marks card and then select Edit table calculation.

2. In the Table Calculation dialog box, choose Specific Dimensions.

Notice that two dimensions are now checked in the list box of dimensions: Quarter of Order Date and Month of Order Date. These are the addressing fields, and because more than one field is being used for addressing, At the level is now available.

The choices available from the At the level drop-down list are:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deepest</strong></td>
<td>Specifies that the calculation should be performed at the level of finest granularity. This is the default option.</td>
</tr>
<tr>
<td><strong>Quarter of Order Date</strong></td>
<td>Specifies that the calculation should be performed at the quarter level.</td>
</tr>
<tr>
<td><strong>Month of Order Date</strong></td>
<td>Specifies that the calculation should be performed at the month level.</td>
</tr>
</tbody>
</table>

3. With this particular view, Deepest and Month of Order Date are equivalent options, and they are both equivalent to just choosing the Table (Down) option from Compute Using. The only option that yields a different result is Quarter of Order Date:
The difference is now calculated between the first month in a given quarter and the first month in the previous quarter.

Table Calculation Type: Percent Difference From

For each mark in the view, a Percent Difference From table calculation computes the difference between the current value and another value in the table, as a percentage.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to see how values change, in terms of percentage, from month to month during the course of each year.

**Click for Information on How to Create the Basic View**

1. Connect to the *Sample - Superstore* data source.

2. Click and drag the *Order Date* field in the Data pane and drag it to the Columns shelf.
   
   The default date level is YEAR(Order Date).

3. Click and drag *Order Date* again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose *Quarter*. 

<table>
<thead>
<tr>
<th>Quarter of O..</th>
<th>Month of Or..</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td>$13,946</td>
<td>$18,174</td>
<td>$18,542</td>
<td>$44,703</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>$4,811</td>
<td>$12,211</td>
<td>$22,868</td>
<td>$20,284</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>$55,691</td>
<td>$38,467</td>
<td>$51,186</td>
<td>$53,909</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>$26,295</td>
<td>$34,195</td>
<td>$39,249</td>
<td>$40,112</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>$23,648</td>
<td>$30,132</td>
<td>$56,691</td>
<td>$45,651</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>$34,595</td>
<td>$24,797</td>
<td>$39,430</td>
<td>$48,260</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>$33,946</td>
<td>$28,765</td>
<td>$38,441</td>
<td>$48,428</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>$27,909</td>
<td>$36,896</td>
<td>$33,266</td>
<td>$61,516</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>$81,777</td>
<td>$64,596</td>
<td>$72,908</td>
<td>$90,489</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>$31,453</td>
<td>$31,405</td>
<td>$56,463</td>
<td>$77,794</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>$78,629</td>
<td>$75,973</td>
<td>$82,192</td>
<td>$112,326</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>$69,546</td>
<td>$74,920</td>
<td>$97,237</td>
<td>$90,475</td>
</tr>
</tbody>
</table>
You will see two options named Quarter. Be sure to choose the first one.

The field should now read QUARTER(Order Date).

Note: If you are creating the view on the web, the menu looks a bit different.

5. Click and drag Order Date a third time and drop it on the Rows shelf to the right of QUARTER(Order Date).

6. Click on the right side of the field to open the context menu and this time choose Month (again, choose the first of two options named Month). The field should now read MONTH(Order Date).

7. Drag Sales from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a Percent Difference From table calculation to the basic view.

1. Click the SUM(Sales) field on the Marks card and then select Add table calculation.
2. In the Table Calculation dialog box, choose Percent Difference From as the Calculation Type.
3. Choose Table (Down) from the Compute Using list.

The highlighting in the view shows how this Compute Using value sets the scope of the calculation in the view:

<table>
<thead>
<tr>
<th>Quarter of O..</th>
<th>Month of Or..</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>-66%</td>
<td>-33%</td>
<td>23%</td>
<td>-55%</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>1,058%</td>
<td>215%</td>
<td>124%</td>
<td>166%</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>-49%</td>
<td>-11%</td>
<td>-23%</td>
<td>-26%</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>-16%</td>
<td>-12%</td>
<td>44%</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>46%</td>
<td>-18%</td>
<td>-30%</td>
<td>6%</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>-2%</td>
<td>16%</td>
<td>-3%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>-18%</td>
<td>28%</td>
<td>-13%</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>193%</td>
<td>75%</td>
<td>119%</td>
<td>47%</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>-62%</td>
<td>-51%</td>
<td>-23%</td>
<td>-14%</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>150%</td>
<td>142%</td>
<td>46%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>-12%</td>
<td>-1%</td>
<td>18%</td>
<td>-19%</td>
</tr>
</tbody>
</table>

Comparing the values in the original text view with the values in this view, you can see that the result is correct. For example, in the original view we see that the January 2010 value is 530,288 and the February 2010 value is 318,309. In the updated view, the value for February 2010 is -39.9%, which is 39.9% less than 530,288.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.
You also have the option to click Compute compounded rate if you want the calculation to be compounded.

**Difference from what?**

With a Difference From, Percent Difference From, or Percent From calculation, there are always two values to consider: the current value, and the value from which the difference should be calculated. In most cases, you want to calculate the difference between the current value and the previous value, as in the procedure above. But in some cases you may want something different:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous</td>
<td>Calculates the difference between the current value and the previous value in the partition. This is the default value.</td>
</tr>
<tr>
<td>Next</td>
<td>Calculates the difference between the current value and the next value in the partition.</td>
</tr>
<tr>
<td>First</td>
<td>Calculates the difference between the current value and the first value in the partition.</td>
</tr>
<tr>
<td>Last</td>
<td>Calculates the difference between the current value and the last value in the partition.</td>
</tr>
</tbody>
</table>

**At the level**

Use this setting to set a break (that is, restart of the calculation) in the view, based on a particular dimension. How is this different from just using that dimension for partitioning? In fact, it is partitioning, but it’s partitioning by position rather than by value, which is how partitioning is defined with the Compute Using options.

The At the level option is only available when you select Specific Dimensions in the Table Calculations dialog box, and when more than one dimension is selected in the field immediately below the Compute Using options — that is, when more than one dimension is defined as an addressing field.
This option is not available when you’re defining a table calculation with Compute Using, because those values establish partitions by position. But with Specific Dimensions, because the visual structure and the table calculation are not necessarily aligned, the At the level option is available to let you fine-tune your calculation.

For an example of how the At the level option can affect a table calculation, see Table Calculation Type: Difference From.

Table Calculation Type: Percent From

For each mark in the view, a Percent From table calculation computes a value as a percentage of some other value—typically, as a percentage of the previous value in the table.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):

<table>
<thead>
<tr>
<th>Quarter of O.</th>
<th>Month of Or.</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td>$13,946</td>
<td>$18,174</td>
<td>$18,542</td>
<td>$44,703</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>$4,811</td>
<td>$12,211</td>
<td>$22,868</td>
<td>$20,284</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>$55,691</td>
<td>$38,467</td>
<td>$51,186</td>
<td>$53,909</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>$28,295</td>
<td>$34,195</td>
<td>$39,249</td>
<td>$40,112</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>$23,648</td>
<td>$30,132</td>
<td>$56,691</td>
<td>$45,651</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>$34,595</td>
<td>$24,797</td>
<td>$39,430</td>
<td>$48,260</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>$33,946</td>
<td>$28,765</td>
<td>$38,441</td>
<td>$48,428</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>$27,909</td>
<td>$36,896</td>
<td>$33,266</td>
<td>$61,516</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>$81,777</td>
<td>$64,596</td>
<td>$72,908</td>
<td>$90,489</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>$31,453</td>
<td>$31,405</td>
<td>$56,463</td>
<td>$77,794</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>$76,629</td>
<td>$75,973</td>
<td>$82,192</td>
<td>$112,326</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>$69,546</td>
<td>$74,920</td>
<td>$97,237</td>
<td>$90,475</td>
</tr>
</tbody>
</table>

Instead of absolute sales values, you want to see how each Year/Quarter/Month value differs from the previous month’s value, as a percentage.

Click for Information on How to Create the Basic View
1. Connect to the **Sample - Superstore** data source.

2. Click and drag the **Order Date** field in the Data pane and drag it to the Columns shelf.

   The default date level is **YEAR(Order Date)**.

3. Click and drag **Order Date** again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose **Quarter**.

   ![Context Menu](image.png)

   You will see two options named **Quarter**. Be sure to choose the first one.

   The field should now read **QUARTER(Order Date)**.
5. Click and drag **Order Date** a third time and drop it on the Rows shelf to the right of **QUARTER(Order Date)**.

6. Click on the right side of the field to open the context menu and this time choose **Month** (again, choose the first of two options named **Month**). The field should now read **MONTH(Order Date)**.

7. Drag **Sales** from the Data pane and drop it on Text on the Marks card.

You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a **Percent From** table calculation to the basic view.

1. Click the **SUM(Sales)** field on the Marks card and then select **Add table calculation**.

2. In the Table Calculation dialog box, choose **Percent From** as the **Calculation Type**.

3. Choose **Table (Down)** from the **Compute Using** list.

   The highlighting in the view shows how this **Compute Using** value sets the scope of the calculation in the view:
Comparing the values in the original text view with the values in this view, you can verify that the result is correct. For example, in the original view we see that the January 2011 value is 13,946 and the February 2011 value is 4,811. In the updated view, the value for February 2011 is 34%; you can verify that 4,811 is about 34% of 13,946.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.

**Difference from what?**

With a **Difference From**, **Percent Difference From**, or **Percent From** calculation, there are always two values to consider: the current value, and the value from which the difference should be calculated. In most cases, you want to calculate the difference between the current value and the previous value, as in the procedure above. But in some cases you may want something different:

<table>
<thead>
<tr>
<th>Previous</th>
<th>Calculates the difference between the current value and the previous value in the partition. This is the default value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next</td>
<td>Calculates the difference between the current value and the next value in the partition.</td>
</tr>
<tr>
<td>First</td>
<td>Calculates the difference between the current value and the first value in the partition.</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Last</td>
<td>Calculates the difference between the current value and the last value in the partition.</td>
</tr>
</tbody>
</table>

**At the level**

Use this setting to set a break (that is, restart of the calculation) in the view, based on a particular dimension. How is this different from just using that dimension for partitioning? In fact, it is partitioning, but it’s partitioning by position rather than by value, which is how partitioning is defined with the **Compute Using** options.

The **At the level** option is only available when you select **Specific Dimensions** in the Table Calculations dialog box, and when more than one dimension is selected in the field immediately below the **Compute Using** options — that is, when more than one dimension is defined as an addressing field.

This option is not available when you’re defining a table calculation with **Compute Using**, because those values establish partitions by position. But with **Specific Dimensions**, because the visual structure and the table calculation are not necessarily aligned, the **At the level** option is available to let you fine-tune your calculation.

For an example of how the **At the level** option can affect a table calculation, see Table Calculation Type: Difference From.

**Table Calculation Type: Percent of Total**

For each mark in the view, a **Percent of Total** table calculation computes a value as a percentage of all values in the current partition.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to see the percentage that each month contributes to each year’s total sales. So, for example, you want to see what percent of 2010 sales were realized in January of 2010, what percent in February, and so on.

### Click for Information on How to Create the Basic View

1. Connect to the **Sample - Superstore** data source.

2. Click and drag the **Order Date** field in the Data pane and drag it to the Columns shelf.

   The default date level is YEAR(Order Date).

3. Click and drag **Order Date** again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose **Quarter**.
You will see two options named **Quarter**. Be sure to choose the first one.

The field should now read **QUARTER(Order Date)**.

**Note:** If you are creating the view on the web, the menu looks a bit different.

5. Click and drag **Order Date** a third time and drop it on the Rows shelf to the right of **QUARTER(Order Date)**.

6. Click on the right side of the field to open the context menu and this time choose **Month** (again, choose the first of two options named **Month**). The field should now read **MONTH(Order Date)**.

7. Drag **Sales** from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a Percent of Total table calculation to the basic view.

1. Click the SUM(Sales) field on the Marks card and then select Add table calculation.

2. In the Table Calculation dialog box, choose Percent of Total as the Calculation Type.

3. Choose Table (Down) from the Compute Using list. The highlighting in the view shows how this Compute Using value sets the scope of the calculation in the view:

<table>
<thead>
<tr>
<th>Quarter of Or.</th>
<th>Month of Or.</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td>2.88%</td>
<td>3.86%</td>
<td>3.05%</td>
<td>6.09%</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>0.99%</td>
<td>2.60%</td>
<td>3.76%</td>
<td>2.76%</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>11.50%</td>
<td>8.18%</td>
<td>8.41%</td>
<td>7.35%</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>5.84%</td>
<td>7.27%</td>
<td>6.45%</td>
<td>5.47%</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>4.88%</td>
<td>6.40%</td>
<td>9.32%</td>
<td>6.22%</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>7.14%</td>
<td>5.27%</td>
<td>6.48%</td>
<td>6.58%</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>7.01%</td>
<td>6.11%</td>
<td>6.32%</td>
<td>6.60%</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>5.76%</td>
<td>7.84%</td>
<td>5.47%</td>
<td>8.38%</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>16.89%</td>
<td>13.73%</td>
<td>11.98%</td>
<td>12.33%</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>6.50%</td>
<td>6.67%</td>
<td>9.28%</td>
<td>10.60%</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>16.24%</td>
<td>16.15%</td>
<td>13.51%</td>
<td>15.30%</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>14.36%</td>
<td>15.92%</td>
<td>15.98%</td>
<td>12.33%</td>
</tr>
</tbody>
</table>

Comparing the values in the original text view with the values in this view verifies that the result is correct. For example, the 12 values in the view for 2011 add up to 100%.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.

Choose Compute across all pages if you want the calculation to take account of any dimension on the Pages shelf.
At the level

Use this setting to set a break (that is, restart of the calculation) in the view, based on a particular dimension. How is this different from just using that dimension for partitioning? In fact, it is partitioning, but it’s partitioning by position rather than by value, which is how partitioning is defined with the Compute Using options.

The At the level option is only available when you select Specific Dimensions in the Table Calculations dialog box, and when more than one dimension is selected in the field immediately below the Compute Using options — that is, when more than one dimension is defined as an addressing field.

This option is not available when you’re defining a table calculation with Compute Using, because those values establish partitions by position. But with Specific Dimensions, because the visual structure and the table calculation are not necessarily aligned, the At the level option is available to let you fine-tune your calculation.

Table Calculation Type: Rank

For each mark in the view, a Rank table calculation computes a ranking for each value in a partition.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to see how each month within a given year ranks in total sales, from most sales (ranked 1) to least sales (ranked 12).

Click for Information on How to Create the Basic View

1. Connect to the Sample - Superstore data source.

2. Click and drag the Order Date field in the Data pane and drag it to the Columns shelf.

   The default date level is YEAR(Order Date).

3. Click and drag Order Date again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose Quarter.
You will see two options named **Quarter**. Be sure to choose the first one.

The field should now read **QUARTER(Order Date)**.

**Note:** If you are creating the view on the web, the menu looks a bit different.

5. Click and drag **Order Date** a third time and drop it on the Rows shelf to the right of **QUARTER(Order Date)**.

6. Click on the right side of the field to open the context menu and this time choose **Month** (again, choose the first of two options named **Month**). The field should now read **MONTH(Order Date)**.

7. Drag **Sales** from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a Rank table calculation to the basic view.

1. Click the SUM(Sales) field on the Marks card and then select Add table calculation.

2. In the Table Calculation dialog box, choose Rank as the Calculation Type.

3. Choose Table (Down) from the Compute Using list.

The highlighting in the view shows how this Compute Using value sets the scope of the calculation in the view:

<table>
<thead>
<tr>
<th>Quarter of O.</th>
<th>Month of Or.</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td>11</td>
<td>11</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>12</td>
<td>12</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>6</td>
<td>9</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Comparing the values in the original text view with the values in this view shows that the result is correct. The values run from 1 to 12, and the highest sales total in 2011, for September (81,777), is ranked 1 in the updated view, while the second highest value, for November (78,629) is ranked 2 in the updated view.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.
Descending vs. Ascending

*Ascending* order ranks values from least to most. *Descending* order ranks values from most to least. For Rank table calculation, the default value is *Descending*.

Rank Type

One issue with Rank calculations is that there may be more than one mark with the same value. What would happen, for example, if Tables in the Central region and Appliances in the South region both had sales of exactly $36,729? Tableau lets you specify how to handle such cases by including an additional field in the Table Calculation dialog box when you set Calculation Type to Rank.

The choices are listed below. The number sequence at the beginning of each option show how each option would rank a hypothetical set of four values where two of the values are identical:

<table>
<thead>
<tr>
<th>Option</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition (1, 2, 2, 4)</td>
<td>Identical values are assigned an identical rank. The highest value is ranked 1 and then the next two, identical values, are both are ranked 2. The next value is then ranked 4.</td>
</tr>
<tr>
<td>Modified Competition (1, 3, 3, 4)</td>
<td>Identical values are assigned an identical rank. The highest value is ranked 1 and then the next two, identical values, are both are ranked 3. The next value is then ranked 4.</td>
</tr>
<tr>
<td>Dense (1, 2, 2, 3)</td>
<td>Duplicate values are all given the same rank, which is the next number in the ranking sequence. The next value after the duplicate values is computed as though the duplicate values were a single value.</td>
</tr>
<tr>
<td>Unique (1, 2, 3, 4)</td>
<td>Duplicate values are given unique rankings, according to the direction in which the ranking is being com-</td>
</tr>
</tbody>
</table>
Table Calculation Type: Percentile

For each mark in the view, a **Percentile** table calculation computes a percentile rank for each value in a partition.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):

Instead of absolute sales values, you want to see the values for each month in a given year expressed as a percentile. With this kind of table calculation, the lowest ranked value is assigned the 0 percentile and the highest ranked value is assigned the 100 percentile (assuming the calculation is working in ascending order, which is the default). All other values are assigned a percentile based on their ranking. So for a set of four values, 1, 3, 22, 67, the percentiles would be 0%, 33%, 67%, and 100%, respectively.

Click for Information on How to Create the Basic View
1. Connect to the **Sample - Superstore** data source.

2. Click and drag the **Order Date** field in the Data pane and drag it to the Columns shelf. The default date level is YEAR(Order Date).

3. Click and drag **Order Date** again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose **Quarter**.

You will see two options named **Quarter**. Be sure to choose the first one.

The field should now read **QUARTER(Order Date)**.
Note: If you are creating the view on the web, the menu looks a bit different.

5. Click and drag Order Date a third time and drop it on the Rows shelf to the right of QUARTER(Order Date).

6. Click on the right side of the field to open the context menu and this time choose Month (again, choose the first of two options named Month). The field should now read MONTH(Order Date).

7. Drag Sales from the Data pane and drop it on Text on the Marks card.

You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a Percentile table calculation to the basic view.

1. Click the SUM(Sales) field on the Marks card and then select Add table calculation.

2. In the Table Calculation dialog box, choose Percentile as the Calculation Type.

3. Choose Table (Down) from the Compute Using list.

   The highlighting in the view shows how this Compute Using value sets the scope of the calculation in the view:
Comparing the values in the original text view with the values in this view verifies that the result is correct. The lowest value in the original text table was February (4,711); in the new text view, February is 0.0%; the next lowest value in the original table was January (13,946); in the new view, January is 9.1%.

**Descending vs. Ascending**

**Ascending** order ranks values from least to most. **Descending** order ranks values from most to least. For a Percentile table calculation, the default value is **Ascending**.

Table Calculation Type: Running Total

For each mark in the view, a **Running Total** table calculation aggregates values cumulatively in a partition. It can do this by summing values, averaging values, or replacing all values with either the lowest or highest actual value.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to see a running total of sales for each year, such that each month’s sales are added to all previous months’ sales.

Click for Information on How to Create the Basic View

1. Connect to the Sample - Superstore data source.

2. Click and drag the Order Date field in the Data pane and drag it to the Columns shelf.

   The default date level is YEAR(Order Date).

3. Click and drag Order Date again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose Quarter.
You will see two options named Quarter. Be sure to choose the first one.

The field should now read QUARTER(Order Date).

Note: If you are creating the view on the web, the menu looks a bit different.

5. Click and drag Order Date a third time and drop it on the Rows shelf to the right of QUARTER(Order Date).

6. Click on the right side of the field to open the context menu and this time choose Month (again, choose the first of two options named Month). The field should now read MONTH(Order Date).

7. Drag Sales from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a **Running Total** table calculation to the basic view.

1. Click the SUM(Sales) field on the Marks card and choose **Add table calculation**.

2. In the Table Calculation dialog box, choose **Running Total** as the Calculation Type.

3. Choose **Table (Down)** from the Compute Using list.

The highlighting in the view shows how this **Compute Using** value sets the scope of the calculation in the view:

<table>
<thead>
<tr>
<th>Quarter of Or.</th>
<th>Month of Or.</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>January</td>
<td>$13,946</td>
<td>$18,174</td>
<td>$18,542</td>
<td>$44,703</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>$18,757</td>
<td>$30,385</td>
<td>$41,410</td>
<td>$64,987</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>$74,448</td>
<td>$68,852</td>
<td>$92,596</td>
<td>$118,896</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>$102,743</td>
<td>$133,047</td>
<td>$131,845</td>
<td>$159,008</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>$126,391</td>
<td>$133,179</td>
<td>$188,536</td>
<td>$204,659</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>$160,967</td>
<td>$157,976</td>
<td>$227,967</td>
<td>$252,919</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>$194,933</td>
<td>$186,741</td>
<td>$266,407</td>
<td>$301,347</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>$222,842</td>
<td>$223,640</td>
<td>$299,673</td>
<td>$362,863</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>$304,620</td>
<td>$288,236</td>
<td>$372,581</td>
<td>$453,352</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>$336,073</td>
<td>$319,640</td>
<td>$429,044</td>
<td>$531,146</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>$414,702</td>
<td>$395,613</td>
<td>$511,236</td>
<td>$643,472</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>$484,247</td>
<td>$470,533</td>
<td>$608,474</td>
<td>$733,947</td>
</tr>
</tbody>
</table>

Comparing the values in the original text view with the values in this view shows that the result is correct. The monthly values ascend steadily and the December value (484,247) is the same value you see if you show column grand totals (from the Analysis menu, select **Totals > Show column grand totals**).

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.
The Running Total Doesn’t Have to Be a Sum

For a Running Total table calculation, Tableau can update values cumulatively in other ways than summing. Choose one of the options from the drop-down list just below the Calculation Type field:

<table>
<thead>
<tr>
<th>Option</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>Each value is added to the previous value.</td>
</tr>
<tr>
<td>Average</td>
<td>The running total averages the current and all previous values.</td>
</tr>
<tr>
<td>Minimum</td>
<td>All values are replaced with the lowest value in the original partition.</td>
</tr>
<tr>
<td>Maximum</td>
<td>All values are replaced with the highest value in the original partition.</td>
</tr>
</tbody>
</table>

Restarting Every

Use this setting to set a break (that is, restart of the calculation) in the view, based on a particular dimension.

Restarting every can be useful in the following situations:

- With dates or other hierarchies, if you restart every month, as you bring in Year or Quarter, Tableau knows to partition automatically.

- With non-hierarchies, Restarting every affects the sorting. If you want to address on Products and partition by State, but you want the products sorted by SUM(Sales) within each state, you need to include States as an addressing field under Specific Dimensions, but then restart every state. Otherwise, the sort by SUM(Sales) would be based on each product’s sum of sales across all states.

The Restarting every option is only available when you select Specific Dimensions in the Table Calculations dialog box and when more than one dimension is selected in the field immediately below the Compute Using options—that is, when more than one dimension is defined as an addressing field.
This option is not available when you're defining a table calculation with Compute Using.

For example, if you take the result of the Running Total calculation you added above, you can see the effect of Restarting every by doing the following:

1. Click the SUM(Sales) field on the Marks card and choose Edit table calculation.

2. In the Table Calculation dialog box, choose Specific Dimensions.

Notice that two dimensions are now checked in the list box of dimensions: Quarter of Order Date and Month of Order Date. These are the addressing fields, and because more than one field is being used for addressing, Restarting every is now available.

The choices available from the At the level drop-down list are:

<table>
<thead>
<tr>
<th></th>
<th>Specified that the calculation should be performed at the level of greatest granularity. This is the default option. This option does not change the view.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Quarter of Order Date</td>
<td>Specifies that the calculation should be performed at the quarter level.</td>
</tr>
</tbody>
</table>

3. If you choose Quarter of Order Date, the view updates to show the effect of this change:
The calculation now restarts after every quarter. If you click out of the Table Calculations dialog box (to dismiss the highlighting) you can see this more clearly.

4. Click the X in the upper-right corner of the Table Calculations dialog box to close it.

Add Secondary Calculation

With **Running Total** and **Moving Calculation** table calculations, you have the option to transform values twice to obtain the result you want—that is, to add a secondary table calculation on top of the primary table calculation. For example, you could add an initial table calculation to calculate the running total for sales per month within each individual year, and then a secondary calculation to calculate the year-over-year percent difference for each month from one year to the next.

To do this, first add the primary table calculation, as shown above. Then continue as follows:

1. Click the **SUM(Sales)** field on the Marks card and select **Edit table calculation**.

2. In the Table Calculation dialog box, click **Add Secondary Calculation**.
The Table Calculation dialog box expands to show a second panel:

<table>
<thead>
<tr>
<th>Primary Calculation Type</th>
<th>Secondary Calculation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Total</td>
<td>Difference From</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
</tr>
</tbody>
</table>

**Compute Using**

- Table (across)
- Table (down)
- Table (across then down)
- Table (down then across)
- Pane (down)
- Pane (across then down)
- Pane (down then across)
- Cell
- Specific Dimensions

- Year of Order Date
- Month of Order Date
- Quarter of Order Date

**At the level**

**Relative to**

3. In the second panel, choose **Percent Difference From** as the **Secondary Calculation Type**.

4. You do not need to change the **Compute Using** selection: **Table (Across)** is the right option.

5. Click the X in the upper-right corner to dismiss the Table Calculation dialog box.
Now your view shows what you needed: a year-over-year percent difference of a running total:

<table>
<thead>
<tr>
<th>Quarter of</th>
<th>Month of</th>
<th>Order Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2011 2012 2013 2014</td>
</tr>
<tr>
<td>Q1</td>
<td>January</td>
<td>$4,228 $368 $26,161</td>
</tr>
<tr>
<td></td>
<td>February</td>
<td>$11,628 $11,025 $23,576</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>-$5,596 $23,745 $26,299</td>
</tr>
<tr>
<td>Q2</td>
<td>April</td>
<td>$304 $28,798 $27,163</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>$6,787 $55,357 $16,123</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>-$3,011 $69,991 $24,952</td>
</tr>
<tr>
<td>Q3</td>
<td>July</td>
<td>-$8,192 $79,666 $34,940</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>$797 $76,033 $63,191</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td>-$16,384 $84,345 $80,771</td>
</tr>
<tr>
<td>Q4</td>
<td>October</td>
<td>-$16,433 $109,404 $102,102</td>
</tr>
<tr>
<td></td>
<td>November</td>
<td>-$19,089 $115,623 $132,236</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>-$13,715 $137,941 $125,473</td>
</tr>
</tbody>
</table>

Table Calculation Type: Moving Calculation

For each mark in the view, a **Moving Calculation** table calculation determines the value for a mark in the view by performing an aggregation (sum, average, minimum, or maximum) across a specified number of values before and/or after the current value.

A moving calculation is typically used to smooth short-term fluctuations in your data so that you can see long-term trends. For example, with securities data there are so many fluctuations every day that it is hard to see the big picture through all the ups and downs. You can use a moving calculation to define a range of values to summarize using an aggregation of your choice.

Suppose you are starting with the following text view, which shows sales totals broken out by year (from left to right) and by quarter and month (from top to bottom):
Instead of absolute sales values, you want to find out how sales totals are trending over time. To do this, you transform each monthly total so that it averages the monthly total for the two previous months and the current month. So instead of seeing just raw sales totals for October, 2010 (for example), you want to replace that number with a number that averages sales for August, September, and October.

Click for Information on How to Create the Basic View

1. Connect to the **Sample - Superstore** data source.

2. Click and drag the **Order Date** field in the Data pane and drag it to the Columns shelf.

   The default date level is **YEAR(Order Date)**.

3. Click and drag **Order Date** again and drop it this time on the Rows shelf.

4. Click on the right side of the field to open the context menu. Then choose **Quarter**.
You will see two options named **Quarter**. Be sure to choose the first one.

The field should now read **QUARTER(Order Date)**.

**Note:** If you are creating the view on the web, the menu looks a bit different.

5. Click and drag **Order Date** a third time and drop it on the Rows shelf to the right of **QUARTER(Order Date)**.

6. Click on the right side of the field to open the context menu and this time choose **Month** (again, choose the first of two options named **Month**). The field should now read **MONTH(Order Date)**.

7. Drag **Sales** from the Data pane and drop it on Text on the Marks card.
You now have the basic view, showing Sales by Order Date over a four-year period, by month, quarter, and year.

Follow these steps to add a **Moving Calculation** table calculation to the basic view.

1. Click the **SUM(Sales)** field on the Marks card and then click **Add table calculation**.
2. In the Table Calculation dialog box, choose **Moving Calculation** as the **Calculation Type**.
3. Click in the drop-down list below the **Calculation Type** option to display the options that you use to configure the calculation:

   ![Calculation Type](image)

4. Choose from the drop-down list of available aggregations: **Sum**, **Average**, **Minimum**, or **Maximum**. In this case, you want **Average**.
5. Using the **Previous values** option, specify how many marks preceding the current mark should be included in calculating the average. In this case, you want 2.
6. Using the **Next values** option, specify how many marks following the current mark should be included in calculating the average. In this case, you want 0.
7. Click **Current value** to indicate that you want the current value to be included in the
8. Do not click **Null if there are not enough values**. You can select this option if you want the current value to be null if there are not enough previous or next values to perform the calculation as specified. When you do not click this option, Tableau will use as many of the values within the specified range as are available.

When you close the drop-down list, Tableau shows a summary of the options you have chosen:

![Calculation Type](image)

9. Choose **Table (Down then Across)** from the **Compute Using** list.

This will cause the calculation to run through the entire time range—from January 2010 to December 2013.

Your view is now “smoothed” to show how sales numbers are trending over time:
10. Click the X in the upper-right corner of the Table Calculations dialog box to close it.

Add Secondary Calculation

With **Running Total** and **Moving Calculation** table calculations, you have the option to transform values twice to obtain the result you want—that is, to add a secondary table calculation on top of the primary table calculation. For example, you could add an initial table calculation to calculate the running total for sales per month within each individual year, and then a secondary calculation to calculate the year-over-year percent difference for each month from one year to the next.

For an example showing how to create a secondary calculation, see Table Calculation Type: Running Total.

Customize Table Calculations

You can always customize a table calculation by editing it in the Table Calculations dialog box, but there are other, more specialized ways to customize a table calculation.
Customizing a Table Calculation Using Its Context Menu

Click any field in the view to see a context menu listing ways to customize the field. For a field in the view that has a table calculation, you can change the Compute Using option—that is, the option that determines the direction and scope of the calculation relative to the visual structure of the view. Do this by clicking the field and then choosing an option from the Compute Using list.

For Difference From, Percent Difference From, and Percent From table calculations, you can also specify a different field from which the difference should be computed. Do this by clicking the field and then choosing an option from the Relative to list. The options are Previous, Next, First, and Last.

Customizing a Table Calculation Using the Calculation Editor

You can customize a table calculation by dragging it into the calculation editor:
When you edit a table calculation in the calculation editor, you can click **Default Table Calculation** in the lower-right corner of the editor to open the calculation in the Table Calculation dialog box. This will allow you to create a new named calculated field that uses the same table calculation as the one you are basing the calculation on.

**Nested Table Calculations**

A nested table calculation can be one of two types of calculated fields:

- A calculated field that includes more than one calculated field with a table calculation (as in the example below), or
- A calculated field that itself has a table calculation and includes at least one calculated field with a table calculation.

With nested table calculations, you can set **Compute Using** configurations for individual calculations independently.

Here is a scenario you can try, using the Sample - Superstore data source that is included with Tableau Desktop, which results in a nested table calculation.

1. Drag **Sub-Category** to Columns and **Region** to Rows.
2. Create a calculated field, **1-nest**, with the definition `TOTAL(SUM([Sales]))`.
   - TOTAL is a table calculation function, so this calculated field automatically has a table calculation—when you use it in the view, the field will have the tell-tale table triangle, indicating a table calculation:

3. Create a second calculated field, **2-nest**, with the definition `TOTAL(SUM([Profit]))`.
4. Create a third calculated field, **3-nest**, with the definition `[1-nest] + [2-nest].`
5. Drag **3-nest** and drop it to the right of **Sub-Category** on Columns.
6. Click 3-nest on Columns and choose **Edit Table Calculation**.

In the Table Calculations dialog box, you can now separately configure the underlying table calculations:

![Table Calculation](image)

**Add Reference Lines, Bands and Distributions**

You can add a reference line or band to identify a specific value, region, or range on a continuous axis in a Tableau view. For example, if you are analyzing the monthly sales for several products, you can include a reference line at the average sales mark so you can see how each product performed against the average.

Tableau lets you add multiple reference lines and bands to a view.

**In This Article**

**Types of Reference Lines, Bands, and Distributions**

**Add a Reference Line**

**Add Reference Bands**
Add Reference Distributions

Add Bullet Graphs

Edit Existing Reference Lines, Bands, and Distributions

Remove Reference Lines, Bands, or Distributions

Types of Reference Lines, Bands, and Distributions

You can add reference lines, bands, or distributions to any continuous axis in the view. In Tableau Desktop, you can also add box plots. See Types of Reference Lines, Bands, and Boxes in the Tableau Desktop online help.

- **Reference Lines** - You can add a reference line at a constant or computed value on the axis. Computed values can be based on a specified field. You can also include confidence intervals with a reference line.
- Reference Bands - Reference bands shade an area behind the marks in the view between two constant or computed values on the axis.
Reference Distributions - Reference distributions add a gradient of shading to indicate the distribution of values along the axis. Distribution can be defined by percentages, percentiles, quantiles (as in the following image), or standard deviation.
Reference distributions can also be used to create bullet charts. See Add Bullet Graphs later in this article for specifics.

Add a Reference Line

You can add a reference line to any continuous axis in the view.

To add a reference line:

1. Drag Reference Line from the Analytics pane into the view. Tableau shows the possible destinations. The range of choices varies depending on the type of item and the current view.
In a simple case, the drop target area offers three options:

The terms **Table**, **Pane** and **Cell** define the scope for the item:

For a more complicated view—for example, if the view contains a line chart with multiple or dual axes—Tableau shows you an expanded drop target area:
If you drop the item in one of the three larger boxes in the header (for example, the **Table** box), a separate reference line is added for each continuous field in the view:

But if you drop the item in any of the lower boxes that are aligned with a specific continuous field, the line is added on the corresponding axis, with the specified scope.

When you drop the line in the target area, Tableau displays an **Edit Line** dialog box:
2. Select a continuous field from the **Value** field to use as the basis for your reference line. You can also select a parameter.

You cannot select a continuous field that isn’t currently in the view as the basis for your reference line. If you want to use such a continuous field, do the following:

   a. Drag the continuous field from the Data pane to the Details target on the Marks card.

   b. Change the continuous field's aggregation if necessary.
This will not change the view, but it will allow you to use that continuous field as the basis for your reference band.

c. Click on the reference line in the view and choose Edit to re-open the Edit Line dialog box.

3. Select an aggregation. The aggregations that are displayed depend on the continuous field you select:

   • **Total** - places a line at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing a weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals option the Analysis menu.

   • **Sum** - places a line at the SUM of all the values in either the cell, pane, or entire view.

   • **Constant** - places a line at the specified value on the axis.

   • **Minimum** - places a line at the minimum value.

   • **Maximum** - places a line at the maximum value.

   • **Average** - places a line at the average value along the axis.

   • **Median** - places a line at the median value.

4. Select how you want to label the line:

   • **None** - select this option to not show a label for the reference line.

   • **Value** - select this option to show a label corresponding to the line’s value on the axis.
• **Computation** – select this option to display the name of the continuous field that is the basis for your reference line and any computation that is performed.

• **Custom** – select this option to build a custom label in the text box. You can use the menu to the right of the text box to insert values such as the computation or the value. You can also type text directly into the box, so you could create a value such as `<Field Name> = <Value>`.

5. Specify whether to display the line with a confidence interval, just the line, or just the confidence interval.

Confidence interval distribution bands shade the region in which the population average will fall $n$ of the time, where $n$ is the value you select in the drop-down on the right. You can choose one of the listed numeric values or select a parameter:

The higher the value you select, the wider the bands will be.
Add Reference Bands

Reference bands are shaded areas behind the marks in the view between two constant or computed values on the axis. You can add reference bands to any continuous axis in the view.

To add a reference band:

1. Drag Reference Band from the Analytics pane into the view. Tableau shows the possible destinations. The range of choices varies depending on the type of item and the current view.

In a simple case, the drop target area would offer just three options:

The terms **Table**, **Pane**, and **Cell** define the scope for the item:
For a more complicated view—for example, if the view contains multiple or dual axes—Tableau shows you an expanded drop target area that looks like this:

If you drop the item in one of the three larger boxes in the header (for example, the **Table** box), a separate set of bands is added for each continuous field in the view:
But if you drop the item in any of the lower boxes aligned with a specific continuous field, the band is added on the corresponding axis, with the specified scope.

When you drop the band in the target area, Tableau displays an **Edit Band** dialog box:
2. Select two continuous fields to use as the basis for your reference band, one in the **Value (From)** area and one in the **Value (To)** area. You can also select a parameter. Do not select the same continuous field and aggregation in both areas.
You cannot select a continuous field that isn’t currently in the view as the basis for your reference band. If you want to use such a continuous field, do the following:

a. Drag the continuous field from the Data pane to the Details target on the Marks card.

b. Change the continuous field’s aggregation if necessary.

This will not change the view, but it will allow you to use that continuous field as the basis for your reference band.

c. Click on the reference band in the view and choose Edit to re-open the Edit Band dialog box, and select the continuous field in in the Value (From) area and one in the Value (To) area.

3. Select a computation, one for the Band From value and one for the Band To value. The aggregations that are displayed depend on the continuous field you select:

- **Total** - extends the band to a value that is at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing a weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals option the Analysis menu.

- **Sum** - extends the band to a value that is at the SUM of all the values in either the cell, pane, or entire view.

- **Constant** - extends the band to a value that is at the specified value on the axis.

- **Minimum** - extends the band to a value that is at the minimum value.

- **Maximum** - extends the band to a value that is at the maximum value.

- **Average** - extends the band to a value that is at the average value along the
axis.

- **Median** - extends the band to a value that is at the median value.

4. Select how you want to label the band:

- **None** – select this option to not show a label for the reference band.

- **Value** – select this option to show a label corresponding to the band's value on the axis.

- **Computation** – select this option to display the name of the continuous field that is the basis for your reference band and any computation that is performed.

- **Custom** – select this option to build a custom label in the text box. You can use the menu to the right of the text box to insert values such as the computation or the value. You can also type text directly into the box, so you could create a value such as `<Field Name> = <Value>`.

Add Reference Distributions

When you add a reference band you specify two values between which a band should span. When you add a reference distribution, you specify one, two, or more than two values. With one value, the result is a line; with two or more values the result is a set of one, two, or more bands.

**To add a reference distribution:**

1. Drag **Distribution Band** from the **Analytics** pane into the view. Tableau shows the possible destinations. The range of choices varies depending on the type of item and the current view.

2. Select a scope for the distribution. The terms **Table**, **Pane**, and **Cell** define the scope for the item:
3. Select the computation that will be used to create the distribution:

- **Percentages** - shades the interval between the specified percentage values. Use a comma to separate two or more percentage values (for example, 60, 80), and then specify which measure and aggregation to use for the percentages.

- **Percentiles** - shades intervals at the specified percentiles. Choose **Enter a**
value from the Value drop-down list, and then enter two or more numerical values, delimited by commas (for example, 60, 80 or 25, 50, 75).

- **Quantiles** - breaks the view into the specified number of tiles using shading and lines. When you select this computation, you must also specify the number of tiles (from 3 to 10, inclusive). For example, if you select 3, Tableau calculates the boundaries between the first, second and third terciles by calling the general quantile function and asking for the 33.33 and the 66.66 quantiles. It then shades the three terciles differently.

  Tableau uses estimation type 7 in the R standard to compute quantiles and percentiles.

- **Standard Deviation** - places lines and shading to indicated the specified number of standard deviations above and below the mean. When you select this option you must specify the factor, which is the number of standard deviations and whether the computation is on a sample or the population.

4. Specify how you want to label the distribution bands:

- **None** – select this option to not show a label for the distribution bands.

- **Value** – select this option to show a label corresponding to each distribution band's value on the axis.

- **Computation** – select this option to display the name of the continuous field that is the basis for your distribution bands and any computation that is performed.

- **Custom** – select this option to build a custom label in the text box. You can use the menu to the right of the text box to insert values such as the computation or the value. You can also type text directly into the box, so you could create a value such as `<Field Name> = <Value>`. 
5. Specify whether to **Show recalculated band for highlighted or selected data points**. For more information, see *Marks and Data Analysis* in the Tableau Desktop online help.

Add Bullet Graphs

Reference distributions can also be used to create bullet graphs. A bullet graph is a variation of a bar graph developed to replace dashboard gauges and meters. The bullet graph is generally used to compare a primary measure to one or more other measures in the context of qualitative ranges of performance such as poor, satisfactory, and good. You can create a bullet graph by adding two reference lines: a distribution to indicate the qualitative ranges of performance, and a line to indicate the target. The following procedure uses Show Me to make this process easier.

1. Select one or more dimensions, and two measures in the **Data** pane. The bullet graph will compare measure values. For example, budget vs. actual; actual vs. target; etc. Select multiple fields in the **Data** pane by holding down the Ctrl key as you click fields. If you are using the Superstore sample workbook, you can select the fields show below:
2. Click the **Show Me** button in the toolbar.

3. Select **Bullet Graph** in the Show Me pane.
Tableau adds a reference distribution that is defined at 60% and 80% of the Average of the measure on Detail. It also adds a reference line that marks the Average of that same measure. The other measure is placed on the Rows shelf.
You can edit either of these to change its definition. For example, you may want to add 100% to the set of distribution band values, or draw a line at a constant value. Click on the outer edge or a distribution band, or on the line, and choose Edit.

Edit Existing Reference Lines, Bands, and Distributions

You can edit existing lines, bands, or distributions. To do this, click on a line or on the outer edge of a band and choose Edit to reopen the edit dialog box for that object.
Remove Reference Lines, Bands, or Distributions

To remove a reference line, band, or distribution, click on a line or on the outer edge of a band and choose Remove. You can also drag a line or band off the view.

Types of Reference Lines, Bands, and Boxes

You can add reference lines, bands, distributions or box plots to any continuous axis in the view. In Tableau Desktop, you can add or edit any of these objects, but when you are working on the web, you can add or edit reference lines or bands.

- **Line** - adds a line at a constant or computed value on the axis. Computed values can be based on a specified field. You can also include confidence intervals with a reference line. See Adding Reference Lines.
• **Band** - shades an area behind the marks in the view between two constants or computed values on the axis. See Adding Reference Bands.
Distribution - adds a gradient of shading to indicate the distribution of values along the axis. Distribution can be defined by percentages, percentiles, quantiles (as in the following image), or standard deviation.
• **Box Plot** - adds a box plot that describes the distribution of values along the axis. Box plots show quartiles and whiskers. Tableau provides different box plot styles, and allows you to configure the location of the whiskers and other details.
Adding Reference Lines

You can add a reference line to any continuous axis in the view.

To add a reference line:

1. Drag Reference Line from the Analytics pane into the view. Tableau shows the possible destinations. The range of choices varies depending on the type of item and the current view.

   In a simple case, the drop target area offers three options:
The terms **Table**, **Pane** and **Cell** define the scope for the item:

![Graphs illustrating different scopes: Entire Table, Per Pane, Per Cell](image)

- **Entire Table**: Adds a reference line to the entire table across all panes.
- **Per Pane**: Adds a reference line on a per pane basis. Computed reference lines are recalculated for each pane in the view.
- **Per Cell**: Adds a reference line within each cell. Computed reference lines are recalculated for each cell in the view.

For a more complicated view—for example, if the view contains a line chart with multiple or dual axes—Tableau shows you a drop target area:
If you drop the item in one of the three larger boxes in the header (for example, the **Table** box), a separate reference line is added for each continuous field in the view:

But if you drop the item in any of the lower boxes that are aligned with a specific continuous field, the line is added on the corresponding axis, with the specified scope.

When you drop the line in the target area, Tableau displays an **Edit Line** dialog box:
2. Select a continuous field from the Value field to use as the basis for your reference line. You can also select a parameter.

You cannot select a continuous field that isn’t currently in the view as the basis for your reference line. If you want to use such a continuous field, do the following:

a. Close the Edit Line dialog box.

b. Drag the continuous field from the Data pane to the Details target on the Marks card.
c. Change the continuous field’s aggregation if necessary.

This will not change the view, but it will allow you to use that continuous field as the basis for your reference band.

d. Click on the reference band in the view and choose Edit to re-open the Edit Line dialog box.

3. Select an aggregation. The aggregations that are displayed depend on the continuous field you select:

   - **Total** - places a line at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing a weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals option the Analysis menu.

   - **Sum** - places a line at the SUM of all the values in either the cell, pane, or entire view.

   - **Constant** - places a line at the specified value on the axis.

   - **Minimum** - places a line at the minimum value.

   - **Maximum** - places a line at the maximum value.

   - **Average** - places a line at the average value along the axis.

   - **Median** - places a line at the median value.

4. Select how you want to label the line:

   - **None** – select this option to not show a label for the reference line.

   - **Value** – select this option to show a label corresponding to the line’s value on
the axis.

- **Computation** – select this option to display the name of the continuous field that is the basis for your reference line and any computation that is performed.

- **Custom** – select this option to build a custom label in the text box. You can use the menu to the right of the text box to insert values such as the computation or the value. You can also type text directly into the box, so you could create a value such as `<Field Name> = <Value>`.

5. Specify whether to display the line with a confidence interval, just the line, or just the confidence interval.

Confidence interval distribution bands shade the region in which the population average will fall $n$ of the time, where $n$ is the value you select in the drop-down on the right. You can choose one of the listed numeric values or select a parameter:
The higher the value you select, the wider the bands will be.

Adding Reference Bands

1. Select how you want to label the band:

Reference bands are shaded areas behind the marks in the view between two constant or computed values on the axis. You can add reference bands to any continuous axis in the view.

To add a reference band:

1. Drag Reference Band from the Analytics pane into the view. Tableau shows the possible destinations. The range of choices varies depending on the type of item and the current view.

In a simple case, the drop target area would offer just three options:

The terms Table, Pane, and Cell define the scope for the item:
For a more complicated view—for example, if the view contains multiple or dual axes—Tableau shows you a drop target area that looks like this:

If you drop the item in one of the three larger boxes in the header (for example, the Table box), a separate set of bands is added for each continuous field in the view:
But if you drop the item in any of the lower boxes aligned with a specific continuous field, the band is added on the corresponding axis, with the specified scope.

When you drop the band in the target area, Tableau displays an **Edit Band** dialog box:
2. Select two continuous fields to use as the basis for your reference band, one in the Value (From) area and one in the Value (To) area. You can also select a parameter. Do not select the identical continuous field and aggregation in both areas.
You cannot select a continuous field that isn’t currently in the view as the basis for your reference band. If you want to use such a continuous field, do the following:

a. Close the Edit Band dialog box.

b. Drag the continuous field from the Data pane to the Details target on the Marks card.

c. Change the continuous field’s aggregation if necessary.

This will not change the view, but it will allow you to use that continuous field as the basis for your reference band.

d. Click on the reference band in the view and choose Edit to re-open the Edit Band dialog box, and select the continuous field in in the Value (From) area and one in the Value (To) area.

3. Select a computation, one for the Band From value and one for the Band To value. The aggregations that are displayed depend on the continuous field you select:

- **Total** - extends the band to a value that is at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing a weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals option the Analysis menu.

- **Sum** - extends the band to a value that is at the SUM of all the values in either the cell, pane, or entire view.

- **Constant** - extends the band to a value that is at the specified value on the axis.

- **Minimum** - extends the band to a value that is at the minimum value.

- **Maximum** - extends the band to a value that is at the maximum value.
- Average - extends the band to a value that is at the average value along the axis.

- Median - extends the band to a value that is at the median value.

4. Select how you want to label the band:

- None - select this option to not show a label for the reference band.

- Value - select this option to show a label corresponding to the band's value on the axis.

- Computation - select this option to display the name of the continuous field that is the basis for your reference band and any computation that is performed.

- Custom - select this option to build a custom label in the text box. You can use the menu to the right of the text box to insert values such as the computation or the value. You can also type text directly into the box, so you could create a value such as `<Field Name> = <Value>`.

Editing Reference Lines, Bands, Distributions, or Boxes

You can edit existing lines or bands. To do this, click on a line or on the outer edge of a band and choose Edit to reopen the Edit Line or Edit Band dialog box.
Removing Reference Lines, Bands, Distributions or Boxes

To remove a reference line or band, click on a line or on the outer edge of a band and choose Remove.

**Embed Views and Dashboards**

**Embed Views into Webpages**

You can embed interactive Tableau views and dashboards into web pages, blogs, wiki pages, web applications, and intranet portals. Embedded views update as the underlying data changes, or as their workbooks are updated on Tableau Server. Embedded views follow the same licensing and permission restrictions used on Tableau Server. That is, to see a Tableau view that's embedded in a web page, the person accessing the view must also have an account on Tableau Server.

Alternatively, if your organization uses a core-based license on Tableau Server, a Guest account is available. This allows people in your organization to view and interact with Tableau views embedded in web pages without having to sign in to the server. Contact your server or site administrator to find out if the Guest user is enabled for the site you publish to.

You can do the following to embed views and adjust their default appearance:
• Get the embed code provided with a view: The Share button at the top of each view includes embed code that you can copy and paste into your webpage. (The Share button doesn’t appear in embedded views if you change the showShareOptions parameter to false in the code.)

• Customize the embed code: You can customize the embed code using parameters that control the toolbar, tabs, and more. For more information, see Parameters for Embed Code.

• Use the Tableau JavaScript API: Web developers can use Tableau JavaScript objects in web applications. To get access to the API, documentation, code examples, and the Tableau developer community, see the Tableau Developer Portal.

Note: For users to successfully authenticate when they click an embedded view, their browsers must be configured to allow third-party cookies.

Writing Embed Code

If you’re writing your own embed code, you can take one of two approaches:

• Use Tableau JavaScript: This is the preferred approach. Use the embed code that Tableau generates as the starting point for your own code, adding or editing object parameters that control the toolbar, tabs, and more. The default embed code, which relies on a Tableau JavaScript file, is also the only way to control the load order of multiple embedded views.

• Specify the View URL: Embed a view using an iframe or image tag, where the source is the URL from the Link box of the Share dialog box. You may want to do this if you can’t use JavaScript on your website. There may also be situations when all you can specify is a URL—such as if you’re embedding a view using the SharePoint Page Viewer Web Part.
When you embed a view, you should define a width and height that the view will be displayed in. Otherwise, the client browser will arbitrarily pick a width and height.

Use Tableau JavaScript

The following code shows an example of embed code that is generated when you click Share on a published view. Special characters in the host_url parameter are URL encoded, and those in the site_root and name parameters are notated as HTML numeric character references.

```html
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder' style='width:800; height:600;'><object class='tableauViz' width='800' height='600' style='display:none;'><param name='host_url' value='http%3A%2F%2Fmyserver%2F'/><param name='site_root' value="/t/Sales'/><param name='name' value='MyCoSales&amp;#47;SalesScoreCard&amp;#47;'/><param name='tabs' value='yes' /><param name='toolbar' value='yes' /></object></div>
```

The source for the `<script>` tag is the URL for the Tableau Server JavaScript file, viz_v1.js. The JavaScript file handles assembling the full URL of the view that’s displayed for your users. The `name` and `site_root` object parameters are the only required parameters; all other parameters are optional.

Specify the View URL

Here’s an example of embedding the same view using an IFrame, where the source is the URL from the Link box of the Share dialog box:

```html
<iframe src="https://myserver/t/Sales/views/MyCoSales/SalesScoreCard?embed=yes&amp;:tabs=yes&amp;:toolbar=yes" width="800" height="600"></iframe>
```
The `embed` URL parameter is required, and you can optionally include parameters that control the toolbar and revert options, among others. You can also add filters to the URL that control the specific data that shows when a view is loaded.

**Parameters for Embed Code**

You can configure an embedded view using either of these methods:

- Object parameters for JavaScript tags
- URL parameters for iframe tags

**Object parameters for JavaScript tags**

<table>
<thead>
<tr>
<th>Object Parameter</th>
<th>Values</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>customViews</td>
<td>no</td>
<td>Hides the Remember my changes option.</td>
<td><code>&lt;param name='customViews' value='no'/&gt;</code></td>
</tr>
<tr>
<td>device</td>
<td>desktop; tablet; phone</td>
<td>If a dashboard has layouts for</td>
<td><code>&lt;param name='device' value='phone'/&gt;</code></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>mobile devices, it displays a specific layout, regardless of the device type.</td>
<td>On</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If this parameter isn't set, Tableau Server detects IFrame size and loads the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Embed Dashboards for examples.</td>
<td></td>
</tr>
<tr>
<td>filter</td>
<td>string</td>
<td>Customizes what data is displayed when the view opens. You can also filter by URL parameters.</td>
<td><code>&lt;param name='filter' value='Team=Blue'/&gt;</code></td>
</tr>
<tr>
<td>host_url</td>
<td>string</td>
<td>Required. The</td>
<td><code>&lt;param name='host_url' value='http://myserver.exampleco.com/'&gt;</code></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>server name</td>
<td>string</td>
<td>The server name as it appears in the URL.</td>
<td><code>&lt;param name=&quot;host_url&quot; value=&quot;http://localhost/&quot;/&gt;</code></td>
</tr>
<tr>
<td>link-target</td>
<td>string</td>
<td>The target window name for external hyperlinks.</td>
<td><code>&lt;param name=&quot;linktarget&quot; value=&quot;_blank&quot;/&gt;</code></td>
</tr>
<tr>
<td>load-order</td>
<td>number</td>
<td>When multiple views are embedded, the default load order is the order.</td>
<td><code>&lt;param name=&quot;load-order&quot; value=&quot;2&quot;/&gt;</code></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>name string</td>
<td></td>
<td>Required object parameter, with this structure:</td>
<td><code>&lt;param name='name' value='ExampleCoSales/Sales'/&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><code>&lt;param name='name' value='ExampleCoSales/Sales/-/jsmith@example.com/EastRegionSales'/&gt;</code></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>book name]/</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[sheet name]/</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[optional custom view]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form at</td>
<td>optional custom view name</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>names like this: user-name-@domain/ [custom view name]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>If you refer to the Tableau Serve- r URL to confirm the value of name, exclude the ses- sion ID (:iid=&lt;n&gt;) at the end of the URL.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:original_view</td>
<td>yes</td>
<td>If the name</td>
<td>&lt;param name='filter' value=':original_view-w=yes'/&gt;</td>
</tr>
<tr>
<td>Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Para-&lt;br/&gt;meter</td>
<td>ref-&lt;br/&gt;ers &lt;br/&gt;to a work-&lt;br/&gt;book or sheet URL (and does not explicitly refer to a custom view) including this parameter displays the view as the original view.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
</tbody>
</table>
| path             | string| For trusted authentication only, cannot be used with the ticket parameter. Over-rides value of the name parameter and is used as the URL. See Display the | `<param name='path' value='trusted/Etdpsm_Ew6rJY-9kRrALjauU/views/workbookQ4/SalesQ4'/>`  
http://tableauserver/trusted/Etdpsm_Ew6rJY-9kRrALjauU/views/-workbookQ4/SalesQ4?:embed=yes&:tabs=yes |
<table>
<thead>
<tr>
<th>Object Parameter</th>
<th>Values</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>View with the Ticket in the Tableau Server Administrator help.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>showShareOptions</td>
<td>true; false</td>
<td>Controls whether the Share options are displayed in an embedded view.</td>
<td>&lt;param name='showShareOptions' value='true' /&gt;</td>
</tr>
<tr>
<td>site_root</td>
<td>string</td>
<td>Required. The site</td>
<td>&lt;param name='site_root' value='#/Sales'/&gt; &lt;param name='site_root' value=''/&gt;</td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>name. The Defau- t site value is null ( value=''). If your server is multi-site and you want to use trusted authentication, see Display the View with the</td>
<td>name. The Default site value is null (value=''). If your server is multi-site and you want to use trusted authentication, see Display the View with the</td>
<td>Examples</td>
<td>Examples</td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Ticket</td>
<td></td>
<td>in the Tableau Server help.</td>
<td></td>
</tr>
<tr>
<td>tabs</td>
<td>yes; no</td>
<td>Displays or hides tabs.</td>
<td><code>&lt;param name='tabs' value='yes'/&gt;</code></td>
</tr>
<tr>
<td>ticket</td>
<td>string</td>
<td>For trusted authentication only, cannot be used with the path object parameter. Must be</td>
<td><code>&lt;param name='ticket' value='9D1ObyqDQmSIOyQpKdy4Sw==:dg62gCsSE0QRArXNTOp6mlJ5'/&gt;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><a href="http://tableau-server/trusted/9D1ObyqDQmSIOyQpKdy4Sw==:dg62gCsSE0QRArXNTOp6mlJ5">http://tableau-server/trusted/9D1ObyqDQmSIOyQpKdy4Sw==:dg62gCsSE0QRArXNTOp6mlJ5</a></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>used with name object to construct the trusted ticket redemption URL. See Display the View with the Ticket in the Tableau Server help.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>toolbar</td>
<td>yes;</td>
<td>The toolbar is &lt;param name='toolbar' value=top'/&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>no;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>to-p</td>
<td>display on the bottom by default. The toolbar is placed above the view when you set this parameter to top and excluded from the embedded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>view</td>
<td>when you set it to no.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tooltip</td>
<td>yes; no</td>
<td>Tool-tips are displayed by default. If you set this parameter to no, however, tool-tips are excluded from the embedded view.</td>
<td>&lt;param name='tooltip' value='no'/&gt;</td>
</tr>
</tbody>
</table>
URL parameters for iframe tags

<table>
<thead>
<tr>
<th>URL Parameter</th>
<th>Values</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>:customViews</td>
<td>no</td>
<td>Hides the Remember my changes option.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcDates?:embed=yes&amp;:customViews=no">http://tabserver/views/DateTime/DateCalcDates?:embed=yes&amp;:customViews=no</a></td>
</tr>
<tr>
<td>:device</td>
<td>desktop; tablet; phone</td>
<td>If a dashboard has layouts for mobile devices, it displays a specific layout, regardless of the device type. If this parameter isn't set, Tableau Server detects screen size and loads the appropriate layout. See Embed Dashboards for examples.</td>
<td><a href="http://tabserver/views/sales/sales_dashboard?:device=tablet">http://tabserver/views/sales/sales_dashboard?:device=tablet</a></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>:embed</td>
<td>yes</td>
<td>Required URL parameter. Hides the top navigation area, better blending the view blend into your web page.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:embed=yes">http://tabserver/views/DateTime/DateCalcs?:embed=yes</a></td>
</tr>
<tr>
<td>:format</td>
<td>pdf; png</td>
<td>Displays a view as a PDF or .png file.</td>
<td><a href="http://tabserver/views/Sales/Q2?:format=pdf">http://tabserver/views/Sales/Q2?:format=pdf</a></td>
</tr>
<tr>
<td>:high-dpi</td>
<td>false</td>
<td>Renders a view using standard DPI (dots per inch) for high-resolution displays and devices.</td>
<td><a href="http://tabserver/views/Sales/Q2?:highdpi=false">http://tabserver/views/Sales/Q2?:highdpi=false</a></td>
</tr>
<tr>
<td>:link-target</td>
<td>string</td>
<td>The target window name for external hyperlinks.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:linktarget=_blank">http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:linktarget=_blank</a></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>:refresh</td>
<td>yes</td>
<td>This URL parameter renders the view using the latest data, rather than a cache from Tableau Server.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?embed=yes&amp;refresh=yes">http://tabserver/views/DateTime/DateCalcs?embed=yes&amp;refresh=yes</a></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Tip:</strong> To continually refresh a view, in the <code>&lt;head&gt;</code> section of the web page, add <code>&lt;meta http-equiv=&quot;refresh&quot; content=&quot;#&quot;&gt;</code>, where <code>#</code> is the number of</td>
<td></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>:render</td>
<td><code>true</code>; <code>false</code>; number</td>
<td>If client-side rendering is enabled (which is the default), setting this to <code>false</code> forces server-side rendering for the session. If client-side rendering is disabled, setting this to <code>true</code> enables it for the session. A number can be used to test</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:render=false">http://tabserver/views/DateTime/DateCalcs?:render=false</a></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>a complexity threshold.</td>
<td>See About Client-Side Rendering in the Tableau Server help.</td>
<td></td>
</tr>
<tr>
<td>:revert</td>
<td>all; filters; sorts;</td>
<td>Returns the item to its original state.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:revert=all">http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:revert=all</a></td>
</tr>
<tr>
<td></td>
<td>axe; shelves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:tabs</td>
<td>yes; no</td>
<td>Displays or hides tabs.</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:tabs=no">http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:tabs=no</a></td>
</tr>
<tr>
<td>:toolbar</td>
<td>yes; no; top</td>
<td>The toolbar is displayed by default on the bottom when this parameter is not set. When</td>
<td><a href="http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:toolbar=no">http://tabserver/views/DateTime/DateCalcs?:embed=yes&amp;:toolbar=no</a></td>
</tr>
<tr>
<td>URL Parameter</td>
<td>Values</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>no</td>
<td>the toolbar is excluded from the embedded view. When top, the toolbar is placed above the view.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:tooltip</td>
<td>yes;  no</td>
<td>Tooltips are displayed by default in a view when this parameter is not set. If set to no, tooltips are excluded from the embedded view.</td>
<td><a href="http://t-abserver-/views/workbookQ4/SalesQ4?:embed=yes&amp;:tooltip=no">http://t-abserver-/views/workbookQ4/SalesQ4?:embed=yes&amp;:tooltip=no</a></td>
</tr>
</tbody>
</table>

**Add Filters to Embed Code**

You can include filter values in embedded views so they highlight just the data you want. For example, you may want to include a hyperlink from another part of your web application to an embedded sales performance view that shows only a specific region.
Note: Stories don't support embedded filters.

Script Tag Example

```html
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'>
</script>
<object class='tableauViz' width='800' height='600' style='display:none;'
  >
  <param name='host_url' value='http://myserver/' />
  <param name='site_root' value='' />
  <param name='name' value='Superstore/Product' />
  <param name='filter' value='Region=East' />
</object>

To pass through multiple filters, just separate each value with a comma. For example:

```html
<param name='filter' value='Region=East,West' />
```

Iframe Tag Examples

```html
<iframe src="https://myserver/views/Superstore/Product?:embed=y&Region=East" width="800" height="600"></iframe>

<iframe src="https://myserver/views/Superstore/Product?:embed=yes&Region=East,West" width="800px" height="600px"></iframe>
```

Filter on Multiple Fields

You can pass filters on as many fields as you want, including fields that are not in the original view.
Script Tag Example

```html
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'></script>
<object class='tableauViz' width='800' height='600' style='display:none;'>
  <param name='host_url' value='http://myserver/' />
  <param name='site_root' value='' />
  <param name='name' value='Superstore/Product' />
  <param name='filter' value='Region=Central,South&Customer Segment=Consumer,Home Office' />
</object>
```

Iframe Tag Example

```html
<iframe src="https://myserver/views/Superstore/Product?:embed=y&Region=Central,South&Segment=Consumer,Home Office" width="800" height="600"></iframe>
```

The first box below shows an example of the URL you might get when you click Share on a view and copy the link in the Link field.

The second box shows how you might modify the URL and add it to an Iframe by deleting the showShareOptions and display_count parameters, adding filter parameters for Region and Segment, and adding width and height parameters, to create an embed link that displays only Consumer and Home Office products from the Central and South regions.
Note: If a filter value contains a special character, such as a comma, replace the character with the URL encoding sequence for \ (backslash, \%5c) followed by the URL encoding sequence for the special character. The backslash is needed to escape the special character. For example, the URL encoding sequence for \, (backslash, comma) is \%5c\%2c.
Filter Dates and Times

If you want to filter on a Date/Time field, include the value using the default Tableau format shown below:

```
yyyy-mm-dd hh:mm:ss
```

The time part uses a 24-hour clock. Many databases store all date values as Datetime fields, so you may need to pass a time value along with your date.

Script Tag Example

```
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'></script>
<object class='tableauViz' width='800' height='600' style='display:none;'>
  <param name='host_url' value='http://myserver/' />
  <param name='site_root' value='' />
  <param name='name' value='Sales/Sales-Performance' />
  <param name='filter' value='Date=2012-12-01' />
</object>
```

This example filters on both a date field and a datetime field:

```
<param name='filter' value='2012-12-01%2022:18:00' />
```

Iframe Tag Example

```
<iframe src="https://myserver/Sales/Sales-Performance?:embed=yes&Date=2008-12-01%2022:18:00" width="800" height="600"></iframe>
```

To filter multiple dates, separate each date with a comma.

Filter Measures

You can filter measures by including one or more values. There is no support for greater than, less than, or ranges. The example below filters to show only $100 and $200 sales.
### Script Tag Example

```html
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'>
</script>
<object class='tableauViz' width='800' height='600' style='display:none;'
</object>
```

### Iframe Tag Example

```html
<iframe src="https://myserver/views/Sales/Sales-Performance?:embed=yes&Profit=100,200" width="800" height="600"></iframe>
```

### How View URLs Are Structured

To understand how Tableau structures view URLs, let's take a close look at a URL in the browser address bar.

- In Tableau Server, the basic URL pattern for a Tableau view is:

  
  http://<servername>/#/views/<workbook>/<sheet>

- In a multi-site environment, for views saved to sites other than Default, the site ID is also included in the URL:

  http://<servername>/#/site/<sitename>/views/<workbook>/<sheet>

Adding parameters to the base URL

To create a filtering URL, you append a *query string* to the base URL.
- For URLs pointing to Tableau Online or Tableau Server, start the query string with a question mark (?).

- For URLs pointing to Tableau Public, because default URLs already include a query string, begin your parameter code with the ampersand (&) character.

Within the query string, parameters (filters) are separated by ampersands (&), and multiple values per parameter are separated by commas. For example:

http://<servername>/#/views/<workbook>/sheet?param1=value1,value2&param2=value

In addition, any characters in your field or sheet names that cannot appear in URLs are URL encoded. For example, a space is converted to %20.

Note: Before you add URL parameters, remove :iid=[#] at the end of the URL. This is a temporary view counter for your current browser session.

Select a view to work with

The examples in this article use the Performance view, in the Superstore sample data that comes with Tableau Server:
The example URL reflects the following attributes:

- The sheet name is **Performance**
- The workbook name is **Superstore**
- The server name is indicated using a placeholder IP address, where your on-premise server name, or online.tableausoftware.com or public.tableausoftware.com would appear.

To follow along with the examples, you can look at a similar view from Superstore, or you can adjust the example URLs to use the field, sheet, and other names from your own environment. If you are using your own view, make sure you publish it to the server.

**Filter the view**

For the example view used in this article, the base URL is:

http:<servername>/#/views/Superstore/Performance

Furniture Only

To display only sales of furniture, at the end of the URL, add the following query string:
For example:

http:<servername>/#/views/Superstore/Performance?Category=Furniture

Consumer Only

To limit the view to Consumer sales, change the URL to:

http:<servername>/#/views/Superstore/Performance?Segment=Consumer
Home Office and Consumer

To show both home office and consumer sales, change the URL to:

http:<servername>/#/views/Superstore/Performance?Segment=Home%20Office,Consumer

Notice that in the field name "Home Office," %20 represents the URL-encoded space character, as described in Adding parameters to the base URL.

Here multiple values are separated with a comma, but not a space.
Furniture in the Central

To show multiple field/value pairs, separate them with an ampersand.

http:<servername>/#/views/Superstore/Performance?Region=Central&Category=Furniture
Exclusive filtering

So far the examples shown in this article display all values for the fields in the resulting views. For more flexibility, you can specify multiple values for a specific filter, and include an additional parameter that displays only particular intersections of those values.

The following URL describes the base, unfiltered view used in this example, showing department sales by region.

http://<servername>/#/views/Superstore/Performance

Next, to show sales for only the Furniture and Technology departments in the Central and West regions, you would add the following query string to the base URL:

?Region=Central,West&Category=Furniture,Technology

To show only Furniture sales in the Central region and Technology sales in the West region, add the ~s0 parameter to the query string used in the previous step.
The final URL looks like this:

http://<server-name>/#/views/Superstore/Performance?Region~s0=Central,West&Category~s0=Furniture,Technology

Special considerations for date filtering

When you want to filter date fields, take into account how dates are formatted and behave in a database environment:

- Date (and time) values passed via URL parameter need to match the following Tableau default format:

  yyyy-mm-dd hh:mm:ss

- Many databases store dates as datetime values, so you may need to include a time part in the value you provide in the parameter.

  The time part is based on a 24 hour clock, so 10:18 pm is specified as 22:18:00.

Example Date parameters

The following example query strings use a date field called **Order Date**. As in the previous examples of this article, you would add these to the base URL of your view.

- If the Order Date field type includes only the date (with no time of day), and you want to show data only for July 8, 2015, the query string would look something like this:

  ?Order%20Date=2015-07-08

- If Order Date includes the time part, to filter on July 8, 2015 at 10:18 pm, the query string might look like this:

  ?Order%20Date=2015-07-08%2022:18:00
- If Order Date is only the date, and you want to filter on multiple dates, you would use commas, as described earlier in this article. For example:


Parameters as DATEPART filters

To filter by date part, use the same nomenclature as in the default Tableau Desktop date hierarchy. For more information, see Date Functions in the Tableau Desktop Help.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>year(Order%20Date)</td>
<td>Integer</td>
</tr>
<tr>
<td>quarter(Order-%20Date)</td>
<td>Integer between 1 and 4</td>
</tr>
<tr>
<td>month(Order-%20Date)</td>
<td>Integer between 1 and 12</td>
</tr>
<tr>
<td>day(Order%20Date)</td>
<td>Integer between 1 and 31</td>
</tr>
<tr>
<td>hour(Order%20Date)</td>
<td>Integer 0–23</td>
</tr>
<tr>
<td>minute(Order-%20Date)</td>
<td>Integer 0–59</td>
</tr>
<tr>
<td>second(Order-%20Date)</td>
<td>Integer 0–59</td>
</tr>
<tr>
<td>week(Order%20Date)</td>
<td>Integer 1–53</td>
</tr>
<tr>
<td>my(Order%20Date)</td>
<td>Six-digit integer: YYYYMM</td>
</tr>
<tr>
<td>mdy(Order%20Date)</td>
<td>Eight-digit integer: YYYYMMDD</td>
</tr>
</tbody>
</table>

Control Load Order for Multiple Embedded Views

You can control the order in which multiple views load for the people working with your views. This feature can only be accessed using embed code that relies on the Tableau JavaScript file.
In the following example, two views are embedded. The second view loads first, followed by the top view. If you embed multiple views and give them all the same load order value, or if you don't specify load order parameters, they are loaded in the order in which they appear on the page.

**Script Tag Example**

```html
<script type='text/javascript' src='http://myserver/javascripts/api/viz_v1.js'>
</script>
<object class='tableauViz' width='600' height='400' style='display:none;'}
   <param name='host_url' value='http://myserver/' />
   <param name='site_root' value='null' />
   <param name='name' value='MyCoSales/TopPerformers' />
   <param name='tabs' value='yes' />
   <param name='toolbar' value='yes' />
   <param name='filter' value='Salesperson=Top 5' />
   <param name='load-order' value='0' />
</object>
</script>
<object class='tableauViz' width='600' height='400' style='display:none;'}
   <param name='host_url' value='http://myserver/' />
   <param name='site_root' value='null' />
   <param name='name' value='MyCoSales/SalesScoreCard' />
   <param name='tabs' value='yes' />
   <param name='toolbar' value='yes' />
   <param name='load-order' value='-1' />
</object>
```
Embed Dashboards

You can embed a Tableau dashboard in your own web site or wiki page and you can have it display in different layouts based on the size of the IFrame.

- To automatically make the right layout appear for your users, regardless of which device they are using, create device-specific layouts for your dashboard in Tableau Desktop. Tableau Server automatically displays the correct layout based on IFrame size, provided you use 100% for the IFrame’s width and height instead of exact pixel values (see below).
- To always make a certain layout appear, regardless of IFrame size, use the device parameter in your embed code.

In the following example, the embed code displays a dashboard that’s 800 pixels wide by 600 pixels high. Exact width and height values are part of the default embed code you get when you click the Share button at the top of a view or dashboard:

```html
<script type='text/javascript' src='http://mysite.myserver.com/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder' style='width: 800px; height: 600px;'></div>
<object class='tableauViz' width='800' height='600' style='display:none;'><param name='host_url' value='http://mysite.myserver.com' />
<param name='site_root' value='' />
<param name='name' value='ProfitAnalysis/Sales_Dashboard' />
<param name='tabs' value='yes' />
<param name='toolbar' value='yes' />
<param name='filter' value=':original_view=yes' /></object>
```

In this example, where the dashboard uses device-specific layouts, the style attributes for the div class have been removed and the object class values for width and height have been
replaced with 100%. In most cases, the correct layout displays; that is, if width and height aren't also being controlled elsewhere in your CSS.

```html
<script type='text/javascript' src='http://mysite.myserver.com/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder'>
  <object class='tableauViz' width='100%' height='100%' style='display:none;'
    <param name='host_url' value='http://mysite.myserver.com'/>
    <param name='site_root' value='' />
    <param name='name' value='ProfitAnalysis/Sales_Dashboard' />
    <param name='tabs' value='yes' />
    <param name='toolbar' value='yes' />
    <param name='filter' value=':original_view=yes' />
  </object>
</div>
```

The following example assumes that the embedded dashboard has device-specific layouts. The `device` parameter is set to `phone`. This means that, no matter which device displays the dashboard, the layout created for phones will be the one that's displayed.

```html
<script type='text/javascript' src='http://mysite.myserver.com/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder'>
  <object class='tableauViz' width='100%' height='100%' style='display:none;'
    <param name='host_url' value='http://mysite.myserver.com'/>
    <param name='site_root' value='' />
    <param name='name' value='ProfitAnalysis/Sales_Dashboard' />
    <param name='device' value='phone' />
    <param name='tabs' value='yes' />
    <param name='toolbar' value='yes' />
  </object>
</div>
```
IFrame Dimensions and Device Layouts

If a dashboard used device-specific layouts, Tableau uses the largest dimension of the IFrame, whether it’s the height or width, to determine which one to load.

If the largest dimension is... | This dashboard device layout is displayed...
---|---
500 px or less | Phone
501–800 px | Tablet
801+ px | Desktop/Laptop

For details on how to create a dashboard that uses device-specific layouts, see Create Dashboard Device Layouts in the Tableau Desktop help.

Embed Code for Custom Views

When you embed a custom view of a workbook or sheet, the default view is determined by these factors:

- If the embed code URL specifically refers to a custom view, that view is displayed by default.
- If the embed code URL does not refer to a custom view, the Default custom view is displayed by default.
- If no Default custom view has been defined, the original view is displayed by default.

**Note:** To ensure the original view will be displayed by default in an embedded view, make sure the embed code URL for the name parameter does not explicitly refer to a custom view, and include the following filter parameter in the embed code: `<param name='filter' value=':original_view=yes'/>`. 
In the following example, the embed code will always display the original view of the Profit Analysis sheet in the Profit Analysis workbook, because the `filter` parameter is set to `:original_view=yes`, and the `name` parameter does not refer to a specific custom view in the URL for the sheet.

```html
<script type='text/javascript' src='http://mysite.myserver.com/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder' style='width: 1496px; height: 749px;'><object class='tableauViz' width='1496' height='749' style='display:none;'><param name='host_url' value='http://mysite.myserver.com' />
<param name='site_root' value='' />
<param name='name' value='ProfitAnalysis/ProfitAnalysis' />
<param name='tabs' value='yes' />
<param name='toolbar' value='yes' />
<param name='filter' value=':original_view=yes' /></object></div>
```

In this example, the setting for the `name` parameter in this example specifically refers to the URL for a custom view named Furniture (in the Profit Analysis sheet in the Profit Analysis workbook).

```html
<script type='text/javascript' src='http://mysite.myserver.com/javascripts/api/viz_v1.js'></script>
<div class='tableauPlaceholder' style='width: 1496px; height: 749px;'><object class='tableauViz' width='1496' height='749' style='display:none;'><param name='host_url' value='http://mysite.myserver.com' />
<param name='site_root' value='' />
<param name='name' value='ProfitAnalysis/ProfitAnalysis/Furniture' /></object></div>
```
In this example, the name parameter does not refer to a specific custom view in the URL for the sheet, and the original_view parameter has not been specified. The embed code here will display the custom view that has been set to Default in the Profit Analysis sheet in the Profit Analysis workbook. However, if the original view is still the Default (no other custom view has been set to Default), then the original view will be displayed as the default view.

 Embed Views into Wikis

You can easily embed a view into a wiki or other web page simply by putting the view inside an <iframe> tag.

1. Navigate to the wiki page you want to embed a view into.

2. Edit the page and add an <iframe> where the source is the URL from the Email box of the Share View dialog box. For example:
3. Save your changes.

The view is embedded into the wiki page.

If both Tableau Server and the wiki are configured to use Microsoft SSPI, users accessing an embedded view on the wiki will be automatically signed in so they can see the view.

If the server and the wiki are not using the same method for authentication, users will first be asked to sign in to the server before they can see the view.

Embed Images

In addition to embedding a view into a `<script>` or `<iframe>` tag you can also embed the view as an image. When you embed an image the view is not interactive, however, it is updated every time the page fully reloads. That way the image shows the latest data even if the underlying data changes.
1. Navigate to the page where you want to embed the image.

2. Edit the page and add an `<img>` tag where the source is the URL from the Email box of the Share View dialog box for the view, plus the .png file extension. For example:

   `<img src="https://tableauserver/views/Date-Time/DateCalc-s.png" width="900" height="700">

   **Note:** This approach will only work if the user accessing the embedded image also has an active web browser session with Tableau Server and is signed in to Tableau Server using Microsoft SSPI.

**Embed Views into SharePoint (Microsoft SSPI)**

You can embed a Tableau Server view in a SharePoint page. To automatically authenticate Tableau Server users who access the embedded view you have two choices, both of which depend on which user authentication method was selected during Tableau Server Setup in your organization. You can use either **Active Directory** with **Enable automatic logon** to authenticate Tableau Server users (also known as using Microsoft SSPI), or you can use **Local Authentication**—and then also configure Tableau Server for trusted authentication.

If you do not know which type of authentication your Tableau Server uses, contact the Tableau Server administrator before you continue.

This topic applies to the first option, where both Tableau Server and SharePoint are using Microsoft SSPI. If your Tableau Server is using **Local Authentication**, see Embed Views into SharePoint (Local Authentication) for steps.

**Requirements**

**Licensed users:** Anyone who accesses an embedded view must be a licensed user on Tableau Server.
**SharePoint version:** Starting with Tableau Server 8.1, you must use SharePoint 2013 to embed Tableau Server views in SharePoint pages. SharePoint 2013 uses Microsoft .NET Framework version 4.5, which meets Tableau Server’s security requirements.

**TableauEmbeddedView web part:** You must have a TableauEmbeddedView web part deployed to your SharePoint server before you can embed Tableau views in a SharePoint page. For sample SharePoint code and instructions for how to create a web part and deploy it to your SharePoint server, see `C:\Program Files\Tableau\Tableau Server-<version>\extras\embedding\sharepoint`. **Note:** The sample SharePoint code is provided as an example, and may require modification to work in your SharePoint deployment.

**Embedding a View into SharePoint**

You can embed the Tableau web part in a new or existing SharePoint page.

1. Open the page where you want to embed a view and switch to edit mode.

2. In the section of the page where you want to embed the view, on the **Insert** tab, click **Web Part**.

3. Under Categories, in the **Custom** (or **Miscellaneous**) folder, select **Tableau-EmbeddedView**, and then click **Add** in the lower-right corner.
4. Select the TableauEmbeddedView web part, click the drop-down arrow, and then select **Edit Web Part**.

5. On the right side of the page, you can specify the attributes of the
TableauEmbeddedView web part.

- In **Tableau Server Name**, enter the name of your Tableau Server. You do not need to enter "http://" before the Tableau Server name.
- In **View Path**, enter the path to the view you want to embed.

- Specify whether you want to show the toolbar, use Trusted Authentication, use SSL, or if you want to embed the view as an image instead of as an interactive view.

- In the **Appearance** section you can specify a **Title** for the web part, the **Height**, **Width**, **Chrome State**, and **Chrome Type**. In general you should spe-
cify a fixed height (for example, 700 Pixels) and adjust the width to fit the zone.

6. Click **OK** to apply the changes and exit edit mode.

The view will be embedded into the web part that you just created. Your users will not need to log in to Tableau Server to see the embedded view, rather they will be automatically authenticated using Microsoft SSPI.
Embed Views into SharePoint (Local Authentication)

You can embed a Tableau Server view in a SharePoint page. If Tableau Server is using Local Authentication for user authentication, there are some extra steps you need to take before you start embedding views.

This topic describes how to complete the following steps:

- Edit the security permissions for the TableauEmbeddedView.dll file.
- Install and deploy the TableauEmbeddedView.wsp file.
- Verify the web part’s deployment.
- Embed a view in SharePoint using the Tableau web part.

**Note:** If your Tableau Server installation is using Active Directory for user authentication, you can start embedding views right away. For more information, see Embed Views into SharePoint (Microsoft SSPI).

Requirements

**Users:** To access an embedded view, users must be licensed Tableau Server users and their user name on SharePoint must be the same as their user name on Tableau Server.

**SharePoint version:** Starting with Tableau Server 8.1, you must use SharePoint 2013 to embed Tableau Server views in SharePoint pages. SharePoint 2013 uses Microsoft .NET Framework version 4.5, which meets Tableau Server’s security requirements.

Edit Security Permissions for TableauEmbeddedView.dll

Edit the security permissions for TableauEmbeddedView.dll so that all users of the operating system can use it.

1. Locate the TableauEmbeddedView.dll and TableauEmbeddedView.wsp files that install with Tableau Server. If Tableau Server is installed on drive C, the files will be in
the following directory:

C:\Program Files\Tableau\Tableau Server\10.2\extras\embedding\sharepoint\n
2. Copy the files to the root directory of your SharePoint server. The root directory is usually located at C:\Inetpub\wwwroot\wss\VirtualDirectories\<port>\bin, for example:

C:\Inetpub\wwwroot\wss\VirtualDirectories\80\bin

3. To edit the security permissions on TableauEmbeddedView.dll, right-click TableauEmbedded.dll and then select Properties > Security.

4. Under Group or user names, select Everyone, and then click Edit.

5. Under Permissions for Everyone, for the Full control permission, select Allow.
6. Click **OK**.

### Install and Deploy TableauEmbeddedView.wsp

The TableauEmbeddedView.wsp file gives SharePoint more information about what to do with the .dll file. You copied the TableauEmbeddedView.wsp file to the SharePoint root directory in the previous procedure. To install and deploy the .wsp file, follow these steps:

1. Open SharePoint 2013 Management Shell and enter the following command:

   ```
   Add-SPSolution -LiteralPath "C:\Inetpub\wwwroot\wss\VirtualDirectories\80\bin\TableauEmbeddedView.wsp"
   ```

2. On the SharePoint Central Administration home page, click **System Settings**.
3. In the **Farm Management** section, click **Manage farm solutions**.

4. On the Solution Management page, click the solution that you want to deploy.

5. On the Solution Properties page, click **Deploy Solution**.

6. On the Deploy Solution page, in the **Deploy When** section, select one of the following options:
   - **Now**
   - **At a specified time**. Specify a time by using the date and time boxes.

7. In the **Deploy To?** section, in the **A specific web application** list, click **All web applications** or select a specific Web application, and then click **OK**.

8. Open your SharePoint site. Click the settings icon, and then select **Site settings**.

9. Under Site Collection Administration, click **Site collection features**.

10. Scroll to the TableauEmbeddedView feature and then click **Activate** to activate the feature.

**Verify the Web Part's Deployment**

In the following procedure, you will verify that the Tableau web part is installed.
1. Open your SharePoint site in a web browser. 
   It may take a few moments for the site to appear.

2. Click the settings icon, and then select Site settings.


4. Confirm that TableauEmbeddedView.webpart is listed.

Embed a View Using the Tableau Web Part

You can embed the Tableau web part in a new or existing SharePoint page.

1. Open the page where you want to embed a view and switch to edit mode.

2. In the section of the page where you want to embed the view, on the Insert tab, click Web Part.

3. Under Categories, in the Custom (or Miscellaneous) folder, select TableauEmbeddedView, and then click Add in the lower-right corner.
4. Select the TableauEmbeddedView web part, click the drop-down arrow, and then select **Edit Web Part**.

5. On the right side of the page, you can specify the attributes of the
TableauEmbeddedView web part.

- In **Tableau Server Name**, enter the name of your Tableau Server. You do not need to enter "http://" before the Tableau Server name.
- In **View Path**, enter the path to the view you want to embed.

- Specify whether you want to show the toolbar, use Trusted Authentication, use SSL, or if you want to embed the view as an image instead of as an interactive view.

- In the **Appearance** section you can specify a **Title** for the web part, the **Height, Width, Chrome State**, and **Chrome Type**. In general you should spe-
6. Click **OK** to apply the changes and exit edit mode.

Now the view is embedded in the page and users who access it will be automatically signed in based on their user name and password for SharePoint.

This is an example of embedding views into SharePoint using the provided .dll file. You
can also embed views into other types of web application. For more information, see JavaScript API on the Tableau Developer Portal.

Manage Your User Settings

Manage Your Account Settings

Use your Account Settings page to change your display name and password (local users only), add or change your email address, manage your subscription settings, change your start page, change the language and locale you see in Tableau Server, or clear cookies for data connection passwords.

Go to your Account Settings page

- At the top of the browser window, select your name, and then select **My Account Settings**.

Quickly Access Your Content

Use your Content page to quickly browse items that you’ve published and your subscriptions.

At the top of the browser window, select your name, and then select **My Content**.
Manage Your Credentials and Passwords

When you access a workbook or data source that has a live connection to data and requires you to sign in, Tableau offers to save your password for you. If you accept, it stores your credentials in a cookie or an access token, depending on the data type. You can remove these credentials if you no longer use the data, or you have exceeded the maximum number of saved credentials and want to make room for a new one.

Under Saved Credentials, do either of the following:

- Select the Delete link next to an individual access token.

- Select Clear All Saved Credentials.

When you clear all credentials, the following items are removed from your user account:

- Passwords you used to access published data sources or workbooks that connect to them.

- Access tokens for OAuth data connections, such as to Google or Salesforce.com
Caution: Removing an access token is effectively like “changing the locks.” If the token is stored with workbooks or data sources you published, deleting the token also removes access to the data from those workbooks and data sources. If the token is embedded in an extract connection, and the extract is refreshed on a schedule, the refreshes will not be able to complete until you embed the new credentials or access token into the connection.

Remove connected clients

The first time you sign in to Tableau Server from a Tableau client, a secure token is created and stored in your account. This token allows you to access the site directly, without having to sign in. A client can be the Tableau Mobile app, Tableau Desktop, the Tableau Online sync client, and others.

You can delete a connected client (token) if you no longer use it, or if you want to add a new client but get an error that says you’re already using the maximum number of connected clients. After you remove a connected client from your account, you will need to provide your credentials the next time you access Tableau Server from that client.

- In the Connected clients section, next to the client you want to remove, select Delete.

Opt in to or out of extract refresh failure email notification

If you own published data sources that contain extracts on a refresh schedule, you can receive email notification when the scheduled refresh does not complete successfully.

- Under Email Notification, select the Send email when extract refreshes fail check box to opt in, or clear it to opt out.
The email contains the following information:

- Extract or workbook name.
- The last successful refresh time.
- The number of consecutive times the refresh has failed.

After five consecutive failures, refreshes are suspended until you take an action to resolve the cause of the failure.

- A suggested action to take to address the cause of the failure—such as updating embedded credentials or a path to the original data file—and a link to the server to take the action.

Manage Your Subscription Settings

1. Click **Subscriptions**, and then select the workbook or view.

2. From the **Actions** drop-down menu, select **Change Schedule**, **Change Subject**, **Change Empty View Mode**, or **Unsubscribe**.

   (The empty-view option sends subscription emails only when data exists in a view. It’s a good choice for high-priority alerts.)

Change Your Start Page

To change the start page that appears when you sign in to Tableau Server, navigate to the page you want, click your name in the upper right area of the page, and then click **Make This My Start Page**.

Server administrators can specify a different default start page for all users.

To return to using the default start page, click your user name, and then click **My Account Settings**. For start page, click **Reset to Default**.
The URL for your current start page is displayed here. You can click the link to go to the page.

Language and Locale

The **Language** setting determines the language you see for the Tableau Server user interface. **Locale** affects views, such as how numbers are formatted, or which currency is used.

Change the **Language** and **Locale**, and then click **Save Changes**. The language and locale update immediately.

For Tableau Server, server administrators can change these settings for all users. If you want to select a language that is not supported, contact your administrator to find out whether they can enable additional languages.

Change Your Display Name

If the server is configured to use the internal user management system (Local Authentication) instead of Active Directory, you can change your display name. Select the display name text and enter the new display name, and then click **Save Changes**.
Change Your Password

If the server is configured to use the internal user management system (Local Authentication) instead of Active Directory, you can change your Tableau Server password by clicking Change Password. When you click this link you are asked to enter your Current Password and the New Password (twice). After you've typed in the required information, click Save Password to save the changes.

Change Your Email Address

If you have a subscription for a Tableau Server view or workbook, the email account that receives the subscription is listed on the Account Settings page.

To enter or change the email address that Tableau Server sends subscriptions to, enter the new email address in the Email text box, and then click Save Changes.
Save Passwords for Database Access

Sometimes a view requires you to enter a database user name and password. If you have access to the database you should enter your user name and password into the appropriate text boxes. If you select the **Remember my password** option you will be automatically signed in each time you look at the view. Your sign in information is stored encrypted on the server so you will be automatically signed in even between browser sessions and when accessing the view from multiple computers. This is convenient when you have a select number of views that you access all the time.

Administrators can restrict whether to allow users to remember database passwords. If you are an administrator, see Server Settings (General) to learn more.

To open this view, you must log in to the database that the view uses.

- **Connection Type:** Microsoft SQL Server
- **Authentication:** Database Built-in Security
- **Server:** mssql2012
- **Database:** Election

**Log In**

- **Username:** hwilson
- **Password:**

  - **Remember my password until I log out**
  - **Log In**
Clearing and Resetting Saved Passwords

If your passwords are being saved *(Allow users to save data source passwords* is enabled on the General tab of the Settings page for the server, you can clear your saved passwords. When you do this, the next time you visit the server, you are prompted to enter your user name and password. You may want to do this if your user name and password change so you can begin using and saving your new credentials.

1. Click your name at the top of the page, and then select **My Account Settings**.

![My Account Settings](image)

2. In Manage Credentials, click **Clear All Saved Credentials**.

   **Note:** Administrators can also clear all saved passwords on the server using the **Clear All Saved Credentials** for all users link on the Sever Settings - General page.

Manage Credentials for OAuth Data Connections

If your server administrator has allowed you to save access tokens for OAuth data connections, you can find and manage them in the **Saved Credentials** section on your Account Settings page. Access tokens represent OAuth connections to Salesforce.com, Google BigQuery, or Google Analytics data sources.
Remove a saved access token

To revoke Tableau access to data, delete the associated saved access token from your account.

After you delete the credentials, you will need to sign in to the data the next time you access it. This will create a new saved token.

Your administrator might choose for all users to use the same shared credentials for connecting to a data source. If this is the case, the access token is associated with the data connection for all users, and it does not appear under Saved Credentials on your Account Settings page.

Test connections using saved credentials

1. While you’re signed in to Tableau Server, display your Account Settings page.

2. In the Manage Credentials section, click **Test** link next to the stored connection that you want to test.

This test confirms whether your credentials are approved for OAuth connections and can use access tokens. If a test succeeds, but you cannot access your data through this managed connection, confirm that the credentials you provided for this connection can access your data.
For example, if you accidentally created the connection using your personal Gmail account, but you use a different account to access a Google Analytics database, you will need to delete the saved credentials and sign in to the data using the appropriate Gmail account.

Clear all saved credentials

When you select **Clear All Saved Credentials**, the following items are removed from your user account:

- All access tokens for OAuth connections that are stored in your account.

  **Caution:** If any of these tokens are stored with published workbooks or data sources, deleting them also removes access to the data source from those locations. Effectively, this is like “changing the locks” anywhere the affected tokens are used.

- Passwords you have used to access published data extracts or workbooks that connect to them.
What is a Site?

You might be used to using the term site to mean "a collection of connected computers," or perhaps as the short form of "website." But in Tableau-speak, we use *site* to mean a collection of content (workbooks, data sources, users, etc) that’s walled off from any other content on that instance of Tableau Server. (Another way to say this is that Tableau Server supports multitenancy by allowing server administrators to create multiple sites on the server for different sets of users and content.)

Each site has its own URL and its own set of users, and each site has completely segregated content, projects, and data sources. You can set permissions per user or group on a project, workbook, view, or data source. All server content is published, accessed, managed, and controlled on a per-site basis.

What is a site administrator?

A site administrator is in charge of creating and maintaining the framework on Tableau Server that enables Tableau Desktop users in the organization to publish, share, manage, and connect to data sources and workbooks. Their duties can include creating and managing users and groups, creating *projects* to organize content on the site, assigning permissions to allow users to access the content they need, scheduling extract refreshes, and a few other tasks.

Site administrators and server administrators

In addition to a site administrator, there’s also a *server administrator*. The server administrator sets up Tableau Server—they install and upgrade it, configure the services that run on Tableau Server, back it up, and perform other tasks that pertain to running Tableau Server as a whole. Server administrators also create sites as needed. (Site administrators don’t have permissions to create sites.)
In some organizations, the same person might be both a server administrator and the site administrator for one or more sites. Even so, the tasks performed by a site administrator and a server administrator are distinct.

About this guide

This guide tells you, a site administrator, how to plan, create, and manage sites on an instance of Tableau Server. Note the following:

- We don't cover the duties of a server administrator. We have a separate guide that covers those tasks.
- We don't discuss how to publish content to the server. Users do this from Tableau Desktop. However, we do discuss how to set up users on the site and give them permissions to publish and view the content that they need. For information about how to publish to Tableau Server, see Publish Data Sources and Workbooks in the Tableau Desktop documentation.

Navigate Site Admin Pages

When you sign in to Tableau Server as a site administrator, you see additional menus for site and content management that are not available to other users. If your server is configured for multiple sites, a site menu is available for navigation.

A site administrator can:

- Manage content and assign permissions.
- View and manually run schedules set up by the server administrator for extract refreshes and subscriptions.
- Manage extract refreshes and subscriptions.
- Add and manage site users (if allowed by the server administrator; see Add or Edit
Sites).

- Add and manage site groups.
- Monitor site activity.

Site Administrator Pages

Site administrators manage all site content and access on a per-site basis. If you have access to multiple sites on the server, all of the sites that you manage will be available from the site menu. If you manage a single site on the server, no site selection is necessary, all site-related menus will be available.

On a single-site server, these are the menus a site administrator sees:

On a multi-site server, with a site selected, these are the menus a site administrator sees:

The site menu displays the name of currently selected site. To go to another site, click the site menu, and then select the site name.
Planning a Site

Before you add users and content to a site, we recommend that you plan the following aspects of a site. Details about each of these aspects of site administration are provided in this guide.

- Projects
- Users and groups
- Site roles and permissions
- Extract refresh schedules
- Steps for setting up your site

Projects

You can create projects on a site, which lets you organize related content. For example, you might set up a project to contain all the data sources and workbooks for a project that a group of your colleagues are working on together. Or you might set up different projects for different departments.
Projects are also useful because you can set up different permissions for each project. If you know what projects you'll need and who needs access to the content in those projects, it's usually easier to set up permissions before users publish content.

Every site has a default project named **Default**. As we explain later, we recommend that you do *not* use the **Default** project for content. Instead, use it to set up default permissions; when you create projects, the new projects get their initial set of permissions from the default project. In effect, the default project is a template for new projects.

**Users and groups**

Obviously, it's important to know who needs to access content on your site. Any user who will publish to the site must be able to sign in. If the user already has an account on the server, you'll need to add that user to the site. If the user doesn't already exist, you'll need to create a user account. Either way, make a list of the users who will need to be able to sign in to your site. (Users can belong to more than one site.)

**Note:** The server license might restrict how many users you can have. Tableau Server licenses are based on either cores or users. If the server has a user-based license, there's an upper limit to how many users can have active accounts on the server. Check with the server administrator to make sure that you'll be able to have an account for all your users.

In general, we recommend that you create groups on the server and then assign users to the groups. This makes it much easier to manage permissions, since you can assign permissions to a group, and all the users in that group automatically get those permissions. (See the next section.) It's typical to create groups for users who use content in similar ways. For example, you might create a group named SalesWBPublishers for all the users in the Sales department who publish workbooks, and a separate group named SalesDSPublishers for people in the Sales department who publish data sources. (These groups need different permissions, so it makes sense to have different groups for these functions.)
Site roles and permissions

Each user has a site role that determines the maximum permissions that they can have on the site. For example, if you have the role of Site Administrator, you have full rights to work on the site. A user whose site role is Publisher can publish to the site, whereas a user whose site role is Interactor can interact with content (for example, change filter settings in a view), but can't publish. A user whose site role is Viewer can view content, but can't change settings in the content and can't publish.

As part of your site planning, decide what site role each user will have. (You can change a user's site role later if you need to.) A user with a site role that's too restrictive might not be able to do the work they need on your site. But by the same token, it's a security best practice to restrict users' permissions to only what they need in order to do their work (that is, to follow the principle of least privilege).

You must also determine what permissions a user needs in order to be able to work with content. Each piece of content on the site (each workbook, data source, and project) supports certain capabilities. For example, a workbook has capabilities like View, Save, Filter, Web Edit, Add Comments, and Download, among others. Before a user can use a workbook—view it, save it, download it, add comments to it, and so on—that user must have permission for the specific capability. Therefore, you should map out what permissions users will need in order to be able work with content.

As we just noted, site roles act as an upper limit on permissions. It's actually the combination of site role and permissions that determines what a user can do. A user whose site role is Interactor can never publish to the site, no matter what permissions you grant that users. But a user whose site role is Publisher can publish a workbook to the site only if that user has permission to save and view workbooks.

To make it easier to manage permissions, create groups and assign the permissions to those groups. You can then add users to the groups that have the permissions that those users need. (Site administrators automatically have permissions for all the capabilities of all content, so they don't need to be explicitly assigned any permissions.)
If you are new to using permissions in Tableau Server, see Projects and Content Permissions in the Everybody’s Install Guide for a walkthrough that uses a best practice approach to setting up permissions.

Extract refresh schedules

If users publish data sources or workbooks that include extracts, you usually want to make sure that the extracts are refreshed so that they contain the latest data. Users can manually refresh an extract, but this isn’t always a good idea if the extract is large and the refresh takes a long time. Instead, you can set up schedules for when an extract should be refreshed. Another planning task for a site administrator is therefore to think about when extracts should be refreshed and to work out schedules.

Steps for setting up your site

The table below shows a loose sequence of steps for setting up a site. You can complete the steps in any order that makes sense for you. At the bottom of this topic you’ll find a list of links to more resources for each of the steps.

Before you configure the site, we recommend spending some time learning about site authentication, site roles, projects, and permissions. Create and document a plan for your projects, groups, and overall permissions strategy. Setting up a test project to experiment with different settings is a good way to iron out these issues. You can change many site settings after your users are working with the site, but try to go in with the intention of minimizing post-production changes.

<table>
<thead>
<tr>
<th>Configure site access</th>
<th>If your organization uses single sign-on, you can configure your site to use SAML authentication. Otherwise, you can use the default Tableau ID authentication, where each user signs in using a user name and password.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Talk to your server administrator about whether</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Customize site</td>
<td>You can customize how Tableau Server looks in order to personalize it for your company or group. You can change the server name that appears in the browser; you can add a company logo (used for all sites on the server). You can also configure language preferences and install custom fonts. See Customize the Server.</td>
</tr>
<tr>
<td>Create projects</td>
<td>Projects let you organize content and help you manage users' access (permissions) to data sources and workbooks that are published to your site. You can set default groups and permissions for all content on the Default project, lock the project, and then use it as a template for additional projects you create. Projects can also serve as staging environments.</td>
</tr>
<tr>
<td>Set up the permissions structure</td>
<td>In Tableau, permissions work with site roles to make up a user's access to the site and its contents.</td>
</tr>
<tr>
<td>Add users</td>
<td>Each user who accesses Tableau Server must sign in. Determine the users you want to be able to sign in to the site. If you enabled SAML authentication, determine which of those users will sign in with their single sign-on credentials, and which will use Tableau ID credentials.</td>
</tr>
<tr>
<td>Get your data to Tableau Server</td>
<td>We recommend that you designate a Tableau Desktop user who will publish vetted data sources to the site (that is, who will serve in the data manager role mentioned earlier). These published data sources can then be shared among your Tableau</td>
</tr>
</tbody>
</table>
users.

As the site administrator, you can centrally manage data source permissions. Other attributes that either you or the data manager can maintain centrally are connection information (credentials, access tokens) and refresh schedules for cloud-based data sources. For more information, see Refresh Data on a Schedule.

### Analyze site usage and performance

You can monitor usage, performance, and other metrics by reviewing the following Administrative Views:

- Traffic to Views
- Traffic to Data Sources
- Actions by Specific User
- Actions by All Users
- Actions by Recent Users
- Background Tasks for Extracts
- Background Tasks for Non Extracts

## Dashboard-based Custom Portals

**Note:** This overview was inspired by the work of Tableau Zen Master Mark Jackson. For more details about the process, check out Mark's blog.

The standard Tableau Server interface works great for many organizations, but if you want to create a company-branded experience and don't have API developer skills, consider creating a custom portal based on a Tableau dashboard. A custom portal lets you organize content around specific departments or job roles, and you can even incorporate training that helps people interact with data more fully. As the volume of Tableau content grows, a cus-
tom portal guides your users directly to the data they need, while providing ready access to related views and Tableau Server search so they can easily explore further.

Sketch out a portal design

Begin outside of Tableau, on paper or in a wireframing application. Consider the structure of your organization and the number of Tableau views that apply to each group of users. Do you simply need one level of navigation that points immediately to content? Or might you need to start with a main page that provides navigational links for separate groups of users or report types, followed by a second level with related dashboards and views?

<table>
<thead>
<tr>
<th>Medical Staff</th>
<th>Illness trend report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient demographics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Hospital occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real estate transactions</td>
</tr>
</tbody>
</table>

After you get buy-in on your design from key stakeholders and data consumers, you’re ready to move on to the next phase.

Gather images for logos and navigation elements

Start thinking about images while refining your initial mockup, and then gather them from libraries of clip-art or approved brand graphics, or create them from scratch in an application like Photoshop or SnagIt. PowerPoint can also be a good source if you plan to create navigation thumbnails of common chart types.
Lay out text, images, and selected sheets on a dashboard

Create a workbook with a dashboard for the portal, using a tiled layout for more predictable positioning and scaling of elements on different devices. Then start adding Text and Image objects, as well as any sheets for data views you want to highlight right up front in your portal. To refine spacing between these dashboard elements, insert Blank objects and adjust their size. For more information, see Create a Dashboard.

Tip: For dynamic elements that show popular or recently created content, include sheets based on custom administrative views.

Link dashboard elements to content

If you have a second level of navigation in your portal, use filter actions to point to a secondary dashboard from the main one. To create links that directly open data views, right-click Image objects and choose Set URL. (In our example below, each colored arrow and accompanying text is an image that links to a view URL.) You can even point to empty views with preloaded data sources, encouraging users to create new Tableau content in the web-authoring workspace.

Tip: To add hyperlinks to text objects, include the full URL (for example, http://www.tableau.com).
Publish, test, and refine your portal

Publish the workbook to your server and distribute the dashboard URL to your users. Portal design, like data analysis itself, is a cyclical process. Now that your portal is out in the wild, start gathering user feedback so you can continuously improve the experience.
Tip: As a finishing touch, hide the Tableau toolbar to give your portal a custom feel.
After the question mark at the end of the dashboard URL, add :embed-d=y&amp;t:oolbar=n

Create Users and Groups

Add Users to a Site

Everyone who needs to access Tableau Server—whether to browse, publish, edit content or administer the site—must be added as a user. Administrators can add users to sites in the following ways:

- By adding a local user account or a user account from Active Directory, as described in this topic. You can also add users by importing an Active Directory group. For details, see Create Groups via Active Directory.

- By importing a CSV file that contains user information. For details, see Import Users and CSV Import File Guidelines.

In a single-site environment, administrators can add users to a site on the Users page. In a multi-site environment, you will use the Site Users page. Server administrators must give site administrators the ability to add users to sites. This setting can be enabled or disabled by the server administrator.

Note: Users can be added to sites, or to the server. To add users to the server, see Add Users to the Server. The options available for adding users depends on the authentication method that you select when you first configure Tableau Server. If you are using local authentication, you cannot add Active Directory users. If you are using Active Directory, you cannot add local users.
If you add a user without assigning site membership and role, the user is assigned the Unlicensed role and won’t use a server license (user-based licensing only). The user will exist in Server Users, but will not be a member of any site until you add that user to the site.

On the **Users** (single-site) or **Site Users** (multi-site) page you can see the users on the site you’re currently signed into. You can add users to (or remove them from) the current site only. If a user belongs to more than one site, you can remove that user from the current site.

**Note:** When a site administrator removes a user from a site (and the user only belongs to that one site), the user will be automatically deleted from the server if that user doesn’t own any content.

**Note:** This screenshot is from a single-site environment. In a multi-site environment, this would be the Site Users page.
To add local users to a site

1. In a site, click **Users**, click **Add Users**, and then click **New User**.

   ![Add Users to this Site]

   **Note:** This screenshot is from a multi-site environment. In a single-site environment, this would be the Users page.

2. Enter a user name. If the server is configured for local authentication, using an email address for the user name is the best way to avoid user name collisions (for example, jsmith@example.com instead of jsmith).
Also enter information in the following fields:

- **Display Name**—Type a display name for the user (e.g., *John Smith*).
- **Password**—Type a password for the user.
- **Confirm password**—Retype the password.
- **Email**—This is optional and can be added at a later time in the user profile settings.

3. Select a site role. For details on site roles, see Set Users’ Site Roles.

4. Click **Add User**.

**Note for multi-site servers**: A site administrator can edit an existing local user account only if the administrator has control over all of the sites the user is a member of. For example, if User1 is a member of sites A and B, an administrator of site B only cannot edit User1’s full name or reset the password.
To add Active Directory users to a site

Before adding users to a site, be sure to review User Management in Active Directory Deployments to understand how multiple domains, domain naming, NetBIOS, and Active Directory user name format influence Tableau user management.

1. In a site, click **Users**, and then click **Add Users**, and then click **Active Directory User**.

2. Enter one or more user names (separated by semicolons). If you are adding a user that is from the same Active Directory domain that the server is running on, you can type the AD user name without the domain. The server’s domain will be assumed.
Note: Do not enter the user’s full name in this field; it can cause errors during the importing process.

3. Select a site role. For details on site roles, see Set Users’ Site Roles.

4. Click Import Users.

Set Users’ Site Roles

When you add users to a site on Tableau Server, you must apply a site role to them. The site role determines which users or groups can publish, interact with, or only view published content, or who can manage the site’s users and administer the site itself.

Note: Tableau Server site roles do not correspond to user licenses that you purchase from Tableau (if you are using user-based licensing instead of core-based server licensing). Those licenses allow a certain number of users on the server.
In this topic

Who can publish content

Capabilities the site role determines

General capabilities allowed with each site role

Change a user’s site role

Site roles and Active Directory import and synchronization

Who can publish content

The following site roles allow publishing content:

- Server Administrator (Available in Tableau Server on-premises only)
- Site Administrator
- Publisher
- Viewer (can publish)
- Unlicensed (can publish)

How you enable this role for publishing depends on your server platform.

- Tableau Server: A system change is required on the computers Unlicensed (can publish) users publish from. For more information, see the corresponding quick fix article.
- Tableau Online: No additional steps are required.

Users with a site role of Interactor, Viewer, and Unlicensed cannot publish content to the server.
Capabilities the site role determines

The site role is set at the user level (that is, not on content), to cap what a user can do with content site-wide. For example, a person whose site role is Interactor can never publish content from Tableau Desktop, even if a project’s permission rule assigns the Publisher permissions role to a group the user is a member of.

Site roles also determine who can configure the site or server itself. For example only a Site Administrator or Server Administrator can manage users.

General capabilities allowed with each site role

- **Server Administrator** (Tableau Server only): The server administrator has full access to all server and site functionality, all content on the server, and all users.

- **Site Administrator**: Site administrators can manage groups, projects, workbooks, and data sources (including connection information) for the site. On Tableau Server on-premises, the server administrator determines whether site administrators can add users and assign site roles and site membership. On Tableau Online, site administrators are allowed these capabilities.

  Site administrators also have unrestricted access to the site’s content. A user can be a site administrator on multiple sites.

- **Publisher**: Publishers can sign in, browse the server, and interact with the published views. They also can connect to Tableau Server from Tableau Desktop to publish (upload) and download workbooks and data sources. Publishers cannot manage users.

- **Interactor**: Interactors can sign in, browse the server, and interact with the published views. They are not allowed to publish to the server.

- **Viewer**: Viewers can sign in and see published views on the server but cannot use any interaction features like filtering and sorting. Users with this site role can be allowed only to view and add and view comments.
• **Unlicensed**: Unlicensed users cannot sign in to the server. Users are assigned the Unlicensed role in the following circumstances:
  
  • You import users from a CSV file.
  
  • The number of available licenses is reached at the time you add or import users.
  
  • You remove a user who owns content on the site. The user will still own the content but not be able to do anything with it.

• **Viewer (can publish)**. The user can sign in from Tableau Desktop to publish and download workbooks and data sources, but they cannot interact with content on the server.

• **Unlicensed (can publish)**. The user can sign in from Tableau Desktop to publish workbooks to the server, but they cannot sign in to Tableau Server directly. In addition, they cannot publish data sources or download them from the server.

See also How Permissions are Evaluated.

**Change a user’s site role**

By default both server and site administrators can manage user settings. On Tableau Server, server administrators can configure a site to disallow site administrators the ability to manage users.

1. Sign in to the site, and go to the **Users** area.

2. Select the users, and then select **Actions > Site Role**.
3. Select the new site role, and then click **Change Site Role**.

You can hover the pointer over the information icon to display a matrix that shows the maximum level of general capabilities each site role allows.
Site roles and Active Directory import and synchronization

When you import Active Directory users to a site, you can specify the site role. If a user is not yet a member of any site on the server, the user is added to the site with the assigned role. When you synchronize Active Directory groups, the site role is applied through the Minimum Site Role setting on the Groups - Details page.

If a user already exists in a Tableau Server site, the site role assigned during the import or sync process will be applied if it gives the user more access in a site. Importing or synchronizing users and groups will promote a user’s site role, but not demote a user’s site role.

If a user already has the ability to publish, that ability is maintained. For example, if a user with the current site role of Unlicensed (can publish) is imported with the new site role of Interactor, that user’s site role will be promoted to Publisher on import.

To guarantee a user maintains a site role with equal or greater capabilities in server after an import, the following matrix shows the rules applied for site roles on import. Bold indicates that a site role was promoted to preserve the user’s ability to publish.
**Note:** The **Import Site Role** row abbreviated headers indicate the site role specified for import. The **Current Site Role** column headers represent the current user site role. The table values represent the abbreviated resulting site role. A bold site role in the table indicates a site role promotion that preserves the ability to publish.

- Site Administrator: SA
- Publisher: P
- Interactor: I
- Viewer (can publish): V-P
- Unlicensed (can publish): U-P
- Unlicensed: U

<table>
<thead>
<tr>
<th>Import Site Role</th>
<th>Current Site Role</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA</td>
</tr>
<tr>
<td><strong>Site Administrator</strong> (SA)</td>
<td>SA</td>
</tr>
<tr>
<td><strong>Publisher</strong> (P)</td>
<td>SA</td>
</tr>
<tr>
<td><strong>Interactor</strong> (I)</td>
<td>SA</td>
</tr>
<tr>
<td><strong>Viewer (can publish)</strong> (V-P)</td>
<td>SA</td>
</tr>
<tr>
<td><strong>Viewer</strong> (V)</td>
<td>SA</td>
</tr>
<tr>
<td>Import Site Role</td>
<td>Current Site Role</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>SA</td>
</tr>
<tr>
<td>Unlicensed (can publish)</td>
<td>SA</td>
</tr>
<tr>
<td>(U-P)</td>
<td>SA</td>
</tr>
</tbody>
</table>

**Assign Site Membership**

You can set a site so that both server and site administrators can add or remove users on that site and change their site roles. At the All Sites level, server administrators can manage the sites existing users can sign in to (site membership), and their site role on each.

1. In the site menu, click **Manage All Sites**, and then click **Users**.

2. Select one or more users, and then select **Actions > Site Membership**.
3. Select one or more sites, and a role for each site, and then click **Save**.

![Site Membership](image)

**Guest User**

Core-based licenses of Tableau Server include a Guest user option, which you can use to allow people who don’t have an account on the server to see and interact with Tableau views embedded in web pages.

Guest user access is enabled by default when Tableau Server is installed with a core-based license. If you do not intend to use Guest user access, then you should disable it.

Guest access allows users only to see embedded views. The Guest user cannot browse the Tableau Server interface or see server interface elements in the view, such as user name, account settings, comments, and so on.
Note: Enabling the Guest user for a site can increase the number of potential simultaneous viewers beyond the user list you might be expecting. The administrative view Status > Traffic to Views can help you gauge the activity.

Guest user permissions

A Guest user can have the following permissions:

- **Projects, Workbooks, and Views**: View, Export Image, Summary Data, View Comments, Filter, Full Data, Web Edit, Download (to save a local copy)

- **Data Sources**: View and Download

When a Guest user is included in a group that has a permission rule set on a content item, Guest user permissions do not affect the permission-levels of other users in that group.

Enable or Disable Guest access

You must be a server administrator to change Guest account settings at either the server or the site level. Guest access is enabled by default in core-based licensing installation.

1. In the site menu, click Manage All Sites and then click Settings > General.

2. For Guest Access, select or clear Enable Guest account to toggle Guest user access.

3. Click Save.

This enables the Guest user on all sites. You can then go to the same setting for a specific site. To disallow Guest access for a site:

1. In the site menu, select a site.

2. Click Settings, and on the Settings page, clear the Enable Guest account check box.
If the Guest account is enabled on some or all sites, and you turn off Guest access at the server level, it is turned off for all sites as well.

Additional Guest account characteristics

The Guest user is unique in the following additional ways:

- As a single user account, it represents all unauthenticated users accessing embedded Tableau views.

- You cannot edit it or select it as the owner of a content resource.

- You can add it as a member of groups on a site.

- When enabled, it is a member of the All Users group.

- You cannot delete the account; however, you can turn off access to it by clearing the check box described in the steps above.

- If the Guest user needs to access a workbook with an extract connection, the Guest must also have the View capability on the published data source.

  The Guest user is not allowed to connect to published data sources.

- It is not allowed to save custom views.

- Guest cannot be used in a user filter.

Import Users

To automate the process of adding users to a site, you can create a CSV file that contains user information, and then import the file. You can import users to a site, or, to the server (if you are a server administrator).
Add users from a CSV file to a site

1. In a site, click **Users**, click **Add Users**.

2. Click **Import From File**, click **Browse** and navigate to the file, and then click **Import Users**.

The results of the import are displayed.
For a single-site server, the site roles assigned to the users during the import process will be imported with the users. If a user already exists in the Tableau Server site, the site role assigned during the import process will be applied only if it gives the user more access to the server. Importing users and groups will promote a user's site role, but not demote a user's site role.

3. Click **Done**.

Add users from a CSV file to a server

1. **Single-site**: Click **Users**, and then click **Add Users**.

   **Multisite**: In the site menu, click **Manage All Sites**, click **Users**, and then click **Add Users**.
2. Click **Import From File**, click **Browse** and navigate to the file, and then click **Import Users**.

The results of the import are displayed.

For a multi-site server, when you import users in the Server Users page, you are creating server users with no site affiliation. Because these users do not belong to a site, they cannot have a site role. The only site role a server user can have is either Unlicensed or Server Administrator. When you assign site membership to a server user,
you can specify the site role for that user per site. For details, see Assign Site Membership. If you import the users in the Site Users page, the users will be assigned the site roles you specify in the CSV file, for that site.

3. Click Done.

Multi-site environments

If the server is running multiple sites and you are a server administrator, you can import a CSV file from two different locations. Where existing user accounts are concerned, each location has different capabilities.

- The Server Users page appears in a multi-site environment. Only server administrators can access this page.

You can import the CSV file from here if you want to update existing user accounts in addition to adding new ones. For example, if you import a file that has a new password for each existing user, their passwords will be reset.

- The Site Users page.
Server administrators can add new user accounts with CSV imports and, if existing users are part of the import, the **Password** and **Display Name** fields must either match or be left blank. If new passwords or full names are used, the import will fail.

**Single-site environments**

Server and site administrators on a single-site server perform CSV user imports from the **Users** page in a site.

**Multi-site versus single-site import**

Users can belong to more than one site on the same server, but they must use the same credentials for each site. This becomes important when you’re adding users to a site and those users might already be members of a different site. If you try to import a user who already
exists, and if the user's credentials in the CSV file don't match the existing credentials, the import fails for that user.

**Note:** The issue of credentials mismatch during import doesn't apply if the server is configured to use Active Directory for authentication. In that case, the CSV file should never contain a password, because user passwords are managed by Active Directory.

If you're importing users into a site and you think that the users might already exist on the server, you can try leaving the **Password** column in the CSV file blank. When you import the users, if a user who is defined in the CSV already exists in another site, the user is added to the site where you're importing. However, if the user *doesn't* already exist on the server, the user is created, and the CSV import window alerts you that the new user doesn't have a password. You can then use the server environment to assign a password to any user who doesn't have one.

**Multi-site**

For a multi-site server, when you import users in the Server Users page, you are creating server users with no site affiliation. Because these users do not belong to a site, they cannot have a site role. The only site role a server user can have is either Unlicensed or Server Administrator.

**Single site**

For a single-site server, the site roles assigned to the users during the import process will be imported with the user. If a user you are importing already exists in Tableau Server, the site role assigned during the import process will be applied only if it gives the user more access to the server. Importing users and groups will promote a user's site role, but not demote a user's site role.
CSV Import File Guidelines

You can automate adding users by creating a comma-separated values (CSV) file with user information and then importing the file. You can include attributes in the CSV file, such as site role and the ability to publish, to apply to the users at the same time you import them.

To import users, you can use the server administration pages or the `tabcmd` utility. For details, see Import Users or `createsiteusers` filename.csv.

Note: If you use the `tabcmd` utility to import users, you can pass options on the command line that can specify default values for the users' site roles. For more information, see the `createsiteusers` filename.csv documentation.

You can import users into a site or into the server. If you import users into a site, site roles are applied to the user. If you specify site roles, but importing users would exceed your license limits, users are imported as Unlicensed. If you import users into the server (not into a specific site), the user isn't assigned to a site, and site roles in the CSV file like Publisher and Interactor are treated as Unlicensed.

CSV File Format Requirements

When you create the CSV file for importing users, make sure that the file meets the following formatting requirements:

- The file does not include column headings. Tableau Server assumes that every line in the file represents a user.
- The file is in UTF-8 format, and includes the byte-order mark (BOM).
- Character encodings such as BIG-5 have been converted to UTF-8. You can do this by opening the file in a text editor and using the `Save As` command.
- If a name includes the "@" character other than as a domain separator, you need to refer to the symbol using the hex format: `\0x40`
For example, user@fremont@myco.com should be user-\0x40fremont@myco.com

Required Columns in the CSV File

The following values are required for each user:

- User name

- Password: If Tableau Server is configured to use Active Directory authentication, there must be a Password column, but the column itself should be empty. If the server is using local authentication, you must provide passwords for new users.

Additional Import File Options

The CSV file can contain the following fields, in the order shown here:

- User name. The user name. If the server is configured to use Active Directory, this value must match a user defined in Active Directory. If the user name is not unique across domains, you must include the domain as part of the user name (for example, example\Adam or adam@example). This is the only required field.

- Password. A password for the user. If the server is configured to use Active Directory, this value is not used.

- Display name. The display name is part of the information that's used to identify a user on the server. If the user's display name is already in use, Tableau Server updates the existing user information with the settings in the CSV file. If the server is configured using Active Directory, this value is not used.

- License level (Interactor, Viewer, or Unlicensed). This setting determines the role for a non-administrator user. If you are using the server administration pages to import users, the license level is set only if you are importing into an individual site. If you are using the server administration pages to import users while managing the server (not a specific site), and if the user is not set to be an administrator, the site role
is set to Unlicensed. (You can change the site role later.)

**Note:** In Tableau Server 9.0, license levels have been replaced with site roles. If you create a user using the server UI, you select a site role like Site Administrator, Publisher, Interactor, and View (can publish). For information about site roles, see Set Users' Site Roles. For more information about how the license levels and other values in the CSV file are converted to site roles, see Settings and Site Roles later in this topic.

- **Administrator level** (*System*, *Site*, or *None*). This setting determines whether the user is imported as an administrator. If you are using the site administration pages, you can set the administrator role to *System* only if you are importing while managing the server. If you are using the server administration pages to import users while you are managing a site, and if the administrator role for a user in the CSV file is set to *System*, Tableau Server imports the user as a site administrator.

- **Publisher permissions** (*yes/true/1* or *no/false/0*). This setting determines whether the user has publisher permissions. If you are using the site administration pages, the publisher setting is used only if you are importing into an individual site. If you are importing users while managing a server, this value isn't used.

- **Email address.** The email address is part of the information that's used to identify a user on the server. If the email address is already in use, Tableau Server updates the existing user information with the settings in the CSV file.

The order of the columns is significant. The first column is treated as the user name, the second as the password, the third as display name, etc., regardless of the content in the columns.

**Settings and Site Roles**

The license level, administrator, and publisher settings for a user are used during the import process to set a user’s site role. The following table shows how the settings are converted to
site roles.

<table>
<thead>
<tr>
<th>CSV settings</th>
<th>Site role</th>
</tr>
</thead>
<tbody>
<tr>
<td>License level=(any)</td>
<td></td>
</tr>
<tr>
<td>Administrator=System Publisher=true</td>
<td>System (server) administrator. This setting is valid only if you are importing users while managing the server.</td>
</tr>
<tr>
<td>License level=(any)</td>
<td></td>
</tr>
<tr>
<td>Administrator=Site Publisher=true</td>
<td>Site administrator. This setting is valid only if you are importing users while managing a specific site.</td>
</tr>
<tr>
<td>License level=Interactor</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Publisher</td>
</tr>
<tr>
<td>License level=Interactor</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Interactor</td>
</tr>
<tr>
<td>License level=Viewer</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Viewer (can publish)</td>
</tr>
<tr>
<td>License level=Viewer</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Viewer</td>
</tr>
<tr>
<td>License level=Unlicensed</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Unlicensed (can publish)</td>
</tr>
<tr>
<td>License level=Unlicensed</td>
<td></td>
</tr>
<tr>
<td>Administrator=Publisher=false</td>
<td>Unlicensed</td>
</tr>
</tbody>
</table>
Notes

- If you are importing users while managing the server, you can create users with only two site roles: system (server) administrator and Unlicensed. All other settings are site specific. In that case, if the administrator level for a user in the CSV file is not System, the user’s site role is set to Unlicensed.

- If you have a user-based server installation, and if adding users would exceed the number of users allowed by your license, the users are added as unlicensed users.

Example

The following example shows a CSV file that contains information for several users.

```
henryw,passw0rd,Henry Wilson,Interactor,None,yes,henryw@example.com
freds,pa$$word,Fred Suzuki,Viewer,None,no,freds@example.com
alanw,p@ssword,Alan Wang,Interactor,Site,yes,alanw@example.com
michellek,mypassword,Michelle Kim,Interactor,System,yes,michellek@example.com
```

If you import this file while managing a site, four users are added to that site. The Administrator mode for user Michelle is set to System. However, because you are importing the users into a site, Tableau Server sets user Michelle to be a site administrator, not a system administrator. Three of the users are allowed to publish.

If you import this file while managing the server, four users are added to the server, but they are not added to any site. The site roles in the CSV file (Interactor and Viewer) must be associated with site users, so the site role for the users who are not administrators is set to Unlicensed.

View, Edit, and Delete Users

View and edit site users

Sign in to a site as an administrator, and then click Users. In this page you can set group
membership, set site role, or remove the user from the site.

Click a user name to see the content they own.

Click **Settings** in a user page to view their account settings. The user **Settings** page is available when the user is a member only of sites that the site administrator also controls, and site administrators are allowed to manage users in the site settings.
If Tableau Server is running multiple sites, **Server Users** lists all users on the server system, and **Site Users** displays all users for the current site.

If the server is configured to use the internal user management system (Local Authentication), you can edit the **Display Name**, **Email**, and **Password** for users after they have been added. If you are making many changes, you may find it easier to import the changes from a CSV file. For details, see Import Users and CSV Import File Guidelines.

**For multi-site servers**: Site administrators can edit an existing user’s account as long as the user is a member only of sites that the site administrator also controls, and site administrators are allowed to manage users in the site settings. For example, if User Joe is a member of Site A and Site B and the site administrator is only an administrator of Site B, the site administrator cannot edit Joe’s Full Name or reset his password.

**View and edit server users**

Sign into Tableau Server as a server administrator. On the site menu, click **Manage All**
Sites, and then click Users. In this page you can set site membership or delete the user from the server.

Click a user name to view account settings. The user Settings page is available when the user is a member only of sites that the site administrator also controls, and site administrators are allowed to manage users in the site settings.
Search for users

To search for a specific user, in the Search box on the left, type all or part of the user’s name, and then press Enter.

The search operation checks the display name and user name attributes.

You can use the asterisk (*) character as a search wildcard. For example, searching for John* will return all user names that start with John.

Remove users from a site

You can remove a user from a site only if the user does not own any content (projects, workbooks, views, or data sources). If you attempt to remove a user who owns content, the user site role will be set to Unlicensed, but not removed.

**Note:** When a site administrator removes a user from a site (and the user only belongs to that one site), the user will be automatically deleted from the server if that user doesn't own any content.

1. In a site, click **Users**. Select one or more users to delete, and then select **Actions > Remove**.
2. Click **Remove** in the confirmation dialog.

Delete users from the server

You can delete a user from Tableau Server only if the user does not own any content (projects, workbooks, views, or data sources). If you attempt to delete a user who owns content, the user site role will be set to Unlicensed, but the user will not be deleted.

If a user is a member of multiple sites, and owns content in one or more of those sites, the user will be removed from the sites in which they don't own content. The user will remain a member in sites where they do own content, but demoted to the Unlicensed site role.

1. In the site menu, click **Manage All Sites**, and then click **Users**. In a single-site environment, click **Users**.

   Select one or more users to delete, and then click **Actions > Delete**.
2. Click **Delete** in the confirmation dialog box.

**Change passwords for users of a single site**

To change the password for a user with membership to a single site, sign in to Tableau Server as a site administrator or a server administrator.

1. Ensure that the correct site is selected in the menu.

2. Click **Users**.

3. Click the display name of a user.

4. Click **Settings**.
5. Click the **Change Password** link, edit the password, and then click **Save Password**.

![Change Password link](image)

**Change passwords for users of multiple sites**

To change the password of a user with membership to multiple sites, sign in to Tableau Server as a server administrator.

1. In the site menu, click **Manage All Sites**.
2. Click **Users**.
3. Click the display name of a user.
4. Click the Change Password link, edit the password, and then click Save Password.

Groups

Add Users to a Group

You can organize Tableau Server users into groups to make it easier to manage multiple users. You can create groups on the server or import groups from Active Directory.

To keep Active Directory group membership up-to-date:

- Site administrators can synchronize selected groups on demand in a site. For more information, see Synchronize Active Directory Groups on a Site.

- Server administrators can synchronize all Active Directory groups on the server based on a schedule or on-demand. For more information, see Synchronize All Active Directory Groups on the Server.

To add a user to a group, the group must already exist.
Add users to a group (Users page)

1. In a site, click Users.

2. Select the users you want to add to a group, and then click Actions > Group Membership.

3. Select the groups and then click Save.

Add users to a group (Groups page)

1. In a site, click Groups, and then click the name of the group.

2. In the group’s page, click Add Users.
3. Select the users to be added, and then click Add Users.

Create a Local Group

Local groups are created using the Tableau Server internal user management system. After you create a group you can add and remove users.
Create Groups via Active Directory

You can import Active Directory groups to create matching groups on Tableau Server, as well as a user for each member of an Active Directory group that is not already on the server.

Each user is assigned a site role as part of the import process. If any of the users to be imported exist in Tableau Server, the site role assigned during the import process is applied only if it gives the user more access to the server. Importing users does not demote site roles.

Before importing groups, review User Management in Active Directory Deployments to understand how multiple domains, domain naming, NetBIOS, and Active Directory user name format influence Tableau user management.

1. In a site, click **Groups**, and then click **New Group**.
2. Type a name for the group and click **Create**.

1. In a site, click **Groups**, and then click **Add Groups**
2. Type the name of the Active Directory group you want to import, and then select the
group name in the resulting list.

3. Select the site role for the users.
4. Click **Import**.

**Note:** You cannot change the name of groups imported from Active Directory. The group name can only be changed in Active Directory.

Synchronize Active Directory Groups in a Site

At any time, you can synchronize an Active Directory group with Tableau Server to ensure new users in Active Directory are also added in Tableau Server. You can synchronize individual groups or multiple groups at once.

1. In a site, click **Groups**.

   On the Groups page, select one or more groups.
2. Click **Actions > Synchronize.**

Set the minimum site role for users in an Active Directory group

In the **Groups - Details** page, administrators can set the minimum site role for group users to apply during synchronization.

This setting does not run synchronization; it sets the minimum site role to applied to the group every time synchronization runs. When you synchronize Active Directory groups, new users are added to the site with the minimum site role. If a user already exists, the minimum site role will be applied if it gives the user more access in a site. If you don’t set a minimum site role, new users are added as **Unlicensed** by default.

**Note:** A user's site role can be promoted but never demoted based on the minimum site role setting. If a user already has the ability to publish, that ability will always be maintained. For more information on minimum site role, see Site roles and Active Directory import and synchronization.

1. In a site, click **Groups.**

2. On the Groups page, select a group.
Click **Actions > Minimum Site Role.**

3. Select the minimum site role, and then click **Change Site Role.**

![Minimum Site Role](image)

What happens when users are removed in the source Active Directory?

Users cannot be automatically removed from the Tableau Server through an Active Directory sync operation. Users that are disabled, deleted, or removed from groups in Active Directory remain on Tableau Server so that administrators can audit and reassign the user's
content before removing the user's account completely. For more information, see Sync behavior when removing users from Active Directory.

What happens when a user name changes in the source Active Directory

By default, Tableau Server will not synchronize changes to the user display name after the initial synchronization when the corresponding account is created in Tableau Server. For example, if the user name jsmith is used for the display name John Smith, changing the display name in Active Directory to Joe Smith will not synchronize to the corresponding jsmith user in Tableau Server.

To change this behavior run the following commands in tabadmin:

```bash
tabadmin stop
tabadmin set vizportal.adsync.update_system_user true
tabadmin configure
tabadmin start
```

What happens when an Active Directory group is removed from Tableau Server?

Many Tableau administrators use Active Directory groups to import and create users. After the users are imported into Tableau Server, administrators will then delete the group in Tableau Server. Deleting a group does not delete the users in it.

Synchronize All Active Directory Groups on the Server

As a server administrator, you can synchronize all Active Directory groups on a regular schedule or on-demand on the General tab of the Settings page for the server.
The Last synchronized time indicates the time that synchronization most recently began.

Synchronize Active Directory groups on a schedule

1. **Single-site**: Click Settings > General.

   **Multisite**: In the site menu, click Manage All Sites and then click Settings > General.

2. Scroll down the page to Active Directory Synchronization, and then select Synchronize Active Directory groups on a regular schedule.
3. Select the frequency and time of synchronization.

4. Click Save.

Synchronize all Active Directory groups on demand

At any time, you can synchronize Active Directory groups with Tableau Server to ensure that new users and changes in Active Directory are reflected in all Active Directory groups on Tableau Server.

1. **Single-site**: Click Settings > General.

   **Multisite**: In the site menu, click Manage All Sites, and then click Settings > General.
2. Under **Active Directory Synchronization**, click **Synchronize All Groups**.

View synchronization activity

You can view the results of synchronization jobs in the **Background Tasks for Non Extracts** administrative view. **Queue Active Directory Groups Sync** is the task that queues and indicates the number of **Sync Active Directory Group** tasks to be run.

1. **Single-site**: Click **Status**.

   **Multisite**: In the site menu, click **Manage All Sites** and then click **Status**.

2. Click the **Background Tasks for Non Extracts** link.

3. Set the **Task** filter to include **Queue Active Directory Groups Sync** and **Sync Active Directory Group**.

You can quickly navigate to this administrative view by clicking the **View synchronization activity** link in the **Settings** page for the server.

Set the minimum site role for users in an Active Directory group

In the **Groups - Details** page, you can set the minimum site role for group users to be applied during Active Directory synchronization.
This setting does not run synchronization; instead, it sets the minimum site role to applied to the group every time synchronization runs. The result is that when you synchronize Active Directory groups, new users are added to the site with the minimum site role. If a user already exists, the minimum site role is applied if it gives the user more access in a site. If you don’t set a minimum site role, new users are added as Unlicensed by default.

**Note:** A user’s site role can be promoted but never demoted based on the minimum site role setting. If a user already has the ability to publish, that ability will always be maintained. For more information on minimum site role, see Site roles and Active Directory import and synchronization.

1. In a site, click **Groups**.

2. On the Groups page, select a group.

   Click **Actions > Minimum Site Role**.

3. Select the minimum site role, and then click **Change Site Role**.
What happens when users are removed in the source Active Directory?

Users cannot be automatically removed from the Tableau Server through an Active Directory sync operation. Users that are disabled, deleted, or removed from groups in Active Directory remain on Tableau Server so that administrators can audit and reassign the user's content before removing the user's account completely. For more information, see Sync behavior when removing users from Active Directory.

Quick Start: Synchronize All Active Directory Groups on a Schedule

After you import Active Directory groups in Tableau Server, you can make sure they stay synchronized in Tableau Server by setting up a schedule. You can also synchronize all Active Directory groups on the server on-demand, at any time. The minimum site role setting for the group is applied when users are synchronized.

**Note:** To use this feature, your Tableau Server installation must be set up for Active Directory.

1 Set a minimum site role for synchronization

In a site, click **Groups**. Select a group, and then click **Actions > Minimum Site Role**. Select the minimum site role, and then click **Change Site Role**. Server and site administrators can set the minimum site role for group users to be applied during Active Directory synchronization. If you don’t set a minimum site role, new users are added as **Unlicensed**.
Synchronizing can promote a user's site role, but will never demote a user's site role.

2 Set the schedule

Server administrators can enable synchronization for all Active Directory groups on the General tab of the Settings page for the server. Enable synchronization, select the frequency settings, and then click Save.
All Active Directory groups on the server are synchronized according to the same schedule.

3 Run synchronization on-demand (optional)

On the General tab of the Settings page, click Synchronize All Groups to synchronize all Active Directory groups on Tableau Server immediately. Click this button at any time to ensure new users and changes are reflected in all Active Directory groups on the server.
Click **Synchronize All Groups** to synchronize all Active Directory groups on the server outside of a schedule.

4. View the status of synchronization tasks

Server and site administrators can view the results of Active Directory synchronization jobs in the **Background Tasks for Non Extracts** administrative view. On the server or in a site, click **Status**. Under **Analysis**, click **Background Tasks for Non Extracts** and filter on the **Queue Active Directory Groups Sync** and **Sync Active Directory Group** tasks.

**Queue Active Directory Groups Sync** queues the **Sync Active Directory Group** tasks to be run.

**Delete Groups**

You can delete any group from the server (with the exception of the All Users group). When you delete a group, the users are removed from the group but they are not deleted from the server.
1. In a site, click **Groups**.

2. On the Groups page, select one or more groups to delete.

3. Select **Actions > Delete**.

![Image of the Groups page with a highlighted delete option]

---

**Manage Content Access**

**Set a Site’s Web Authoring Access**

Tableau Server administrators can specify at the site level whether to allow users to edit published views in the web environment.

By default web authoring functionality is enabled for all sites. Users with the **Web Edit** capability to edit workbooks directly on the server. Turn off web authoring if you want users to be able to view and interact with published workbooks but not make any changes to the core information.
The steps below describe how to set web authoring for an entire site. For more granular control over which users can use web editing, you can use projects, groups, and permissions. See Set Web Edit, Save, and Download Access on Content.

**Turn web authoring on or off for a site**

1. In a web browser, sign in to the server as an administrator and go to the site in which you want web authoring to be enabled. In that site, click **Settings**.

2. Select **Allow users to use web authoring** to enable the functionality.

   Clear the check box to turn off web authoring for that site.

3. If your site is already in production, and you want the change to take effect immediately, restart the server.

   Otherwise, the change takes effect after server session caching expires or the next time users sign in after signing out.

**Notes**

- When you enable web authoring, make sure that, on the appropriate workbooks or views, the permission rule for a user or group allows the **Web Edit** capability.

- If you turn off web authoring on a production site and do not complete the last step to restart the server, users might continue to have authoring access until their session caches expire or they sign out.
See which sites allow web authoring

To confirm which sites allow web authoring, on the site-selection menu at the top, select **Manage All Sites**, and then go to the **Sites** page.

![Tableau Site Selection Menu](image)

Set Web Edit, Save, and Download Access on Content

If you’re enabling web authoring functionality on your site, you can configure more precisely which users on the site have access to this functionality. Using site roles and permissions rules at the content level, you can grant or deny **Web edit**, **Save**, or **Download** capabilities on projects, workbooks, and data sources.

**Note:** This document strives to use the phrase **Web edit** only to specify the name of the capability in permissions rules, and **web authoring** to refer to the general functionality of creating and modifying workbooks on the server. However, you might otherwise see these two phrases used interchangably.

Why allow users to work on the server directly

As an administrator, your initial thought about allowing people to populate a site with content, seemingly indiscriminately, might be one of skepticism. However, with a few controls, you can limit where this is done, while providing important benefits that centralized content management offers both you and your users.
Web authoring pros and cons

For publishers and business users, some benefits of web authoring include the following:

- It provides analyst teams who work collaboratively with a central location in which to provide input.
- It enables people who do not have Tableau Desktop to connect to data sources and create workbooks.
- It enables people to access content when they are away from their Tableau Desktop computer or VPN, whether on a computer or a hand-held device.
- It can provide a framework for enabling consistency across Tableau reports.

By making template workbooks available on the server, analysts can download or create new workbooks with data connections, branding, and formatting already in place.

For administrators, benefits can include the following:

- Fewer Tableau Desktop deployments to manage and support.
- Fewer computers that need to have database drivers installed.
- Capacity to govern content.
- More accurate monitoring of what people are doing with Tableau.

Some disadvantages to web editing include the following:

- For analysts, web editing functionality is not as extensive as in Tableau Desktop (although it continues to evolve toward that parity).
- For administrators, more people working on the server might mean upgrading systems.
- Without publishing guidelines, content proliferation on the server is expected.
This can confuse the people who rely on published Tableau dashboards and data sources, degrade server performance and data quality, and potentially affect data security.

Managing permissions to help users avoid content proliferation

To help users to avoid content proliferation on the server, many Tableau administrators use projects to allow varying levels of access to content. For example, one project can allow all users to edit and save workbooks; another can allow only approved publishers to save new content.

To get a better idea how this works, see the following resources:

- Projects and Content Permissions in *Everybody’s Install Guide*
- *Governed Self-Service at Scale*, a Tableau whitepaper by Rupali Jain.

To view the PDF, you might need to provide your Tableau website credentials. These are the same ones you use for the community forums or to submit support cases.

Coordinate edit and save capabilities with site roles for the appropriate level of access

To edit, save, and download workbooks, users must have a site role that allows those actions, along with the capabilities—defined in permissions rules—that grant or deny editing-related access.

Site role access

- When the appropriate permissions are set at the content level, the Publisher site role allows both *Save* (overwrite) and *Save As/Download*.

Publishers can save (overwrite) only workbooks that they own. If a publisher edits a workbook owned by another user, only the *Save As* command is available, and they can save the workbook with a new name.
• The **Interactor** site role allows downloading but not saving (neither overwriting existing nor saving changes to a new workbook).

Capabilities set on content

These capabilities coordinate with the site role to allow levels of editing and saving.

• **Web Edit** determines whether users can edit workbooks directly on the server.

• **Download/Save As** determines whether users have access to the **Save As** option while they are editing a view.

  **Save As** allows users to save changes they’ve made to an existing workbook as a new workbook on the server. It also determines whether they can open a workbook on the server from Tableau Desktop.

  Tableau treats saving like publishing, so to save new workbooks, users must have a site role of **Publisher**.

• **Save** determines whether users can save changes to an existing workbook on the server (overwrite a workbook).

  To overwrite a workbook with changes made on the server, a user must have a site role of **Publisher**.

**Configure site roles and permissions**

Use the tables in the following sections to coordinate the site role with saving and editing capabilities.

Set these capabilities at the project level, using permissions rules.

Allow publishers to edit, save changes to, and download existing and new workbooks

Apply these capabilities to users who have the **Publisher** site role.

<table>
<thead>
<tr>
<th>Capability</th>
<th>For the project</th>
<th>For specified workbooks in the project</th>
</tr>
</thead>
</table>

- 477 -
Allow publishers to edit, save changes to, and download new workbooks, but not overwrite existing workbooks.

Apply these capabilities to users who have the **Publisher** site role.

<table>
<thead>
<tr>
<th>Capability</th>
<th>For the project</th>
<th>For specific workbooks in the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Edit</td>
<td>-</td>
<td>Allowed</td>
</tr>
<tr>
<td>Download/Save As</td>
<td>-</td>
<td>Allowed</td>
</tr>
<tr>
<td>Save</td>
<td>Allowed</td>
<td>Denied</td>
</tr>
</tbody>
</table>

**Important:** In the “save but not overwrite” case above, allowing Save access at the project level is required for publishers to be able to publish workbooks from Tableau Desktop. To deny overwriting existing workbooks, you must deny the **Save** capability explicitly on each relevant workbook, and not lock permissions to the project. If project permissions are locked, permissions set on the project apply to all workbooks in it.

Allow interactors to download workbooks.

Apply these capabilities to users who have the **Interactor** site role.

<table>
<thead>
<tr>
<th>Capability</th>
<th>For the project</th>
<th>For specific workbooks in the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Edit</td>
<td>-</td>
<td>Allowed</td>
</tr>
</tbody>
</table>
The **Save** and **Save As** capabilities will be denied by the Interactor site role, even if you allow them on the content.

See also

- Set Permissions on Individual Content Resources
- Set Users' Site Roles
- Permissions Reference

**Quick Start: Permissions**

You can use permission rules to control access to specific content on a site. Every user has a set of allowed capabilities based on their site role. Each content type—projects, workbooks, views, and data sources—can have permission rules assigned to groups or to specific users. The easiest and most efficient way to manage permissions is to create permission rules for groups.

**1 Add Users to Groups**

Within a site, click **Groups**. Create groups for users who should have the same permissions, and then add the users to these groups. Click a group name, and then click **Add Users** to select the users to be included in the group.
2 Select the Content

On the Content page for a site, click **Workbooks**, **Views**, **Projects**, or **Data Sources**. Select an item in the page. Select **Actions > Permissions** to view the permission rules for that content.
A permission rule is a set of capabilities (such as the ability to edit a view) that are allowed or denied to a user or group of users. Available capabilities vary depending on the type of content selected.

3 Create a Permission Rule

Click Add a user or group rule, select Group, enter search text, and then select a name from the list. Select a permission role template to apply an initial set of capabilities for the group. Click a capability to set it to Allowed or Denied, or leave it Unspecified. Click Save when you are done.
Whether a user can set permissions is based on their site role and how their Set Permissions capability is set.

4View User Permissions

After you save the permission rule for the group, you can view the effective permissions for that content.

Click a group name to see the group’s users and their permissions. Hover over a capability box to see a tooltip with details on whether a capability is allowed or denied.
**Custom** indicates a user's capabilities have been changed from the initial settings for their site role or content role.

**Site roles**

A user's site role determines the maximum permissions allowed for that user.

- Server and site administrators can access all site content with full permissions.
- Owners always get full access to the content they've published, but can only change permissions for their workbooks and data sources when the parent project permissions are not locked.

For more information, see Set Users' Site Roles.

**Permissions evaluation**

- **Denied** takes precedence over **Allowed**.
- **Unspecified** results in **Denied** if no other permissions are specified.
Specific user permissions on content take precedence over group permissions on content. In other words, user permissions trump group permissions.

For a best-practice walkthrough on how to implement permissions, see Projects and Content Permissions.

Content Access and Ownership

In Tableau Server, you set content permissions to specify who is allowed to work with which content resources on a particular site.

For example, you can tightly restrict who has access to your company’s financial information, but widely share organizational development content.

Content resources on which you will generally assign permissions include the following:

- Projects
- Workbooks
- Data sources

Views in a workbook inherit permissions from the workbook, although you might have an edge case for which you want to set permissions for a single view.

What makes up a user’s permissions

When Tableau determines which tasks (or capabilities) a user is allowed to perform on a content resource, it takes the following pieces into account:

**Site roles**: At the time that you add users to a site, you must apply a site role to them. This is the only setting that you apply to users (as opposed to content) to affect permissions. The site role determines whether the user can publish, interact with, or only view published content on that site. See Set Users’ Site Roles.

**Permission rules and templates**: You assign content access through permission rules. These rules describe the capabilities that you want a user or group to be able to perform on a
set of content. Examples of capabilities include editing a view or connecting to a data source. Tableau provides a set of templates for common permission roles, such as Editor, Project Leader, and so on.

**Content ownership:** By default, the person who publishes a data source or workbook to the server is the owner of that content. Ownership changes when another publisher updates the content on the server, or republishes it from Tableau Desktop. An administrator or project leader can change ownership or set defaults for the project.

**User permissions:** are the effective permissions that are the result of evaluating rules and settings, and which ultimately determine what a user can do with the content.

**Who can set permissions**

Users can have the Set Permissions capability. By default, these are:

- Administrators, for all content on the site.
- Project leaders, for all content in the project.
- Content owners, generally publishers for content they publish.

**Default permissions and projects**

The permissions assigned to an item of content when it is published are its default permissions. Administrators and users with the Project Leader capability can set these defaults at the project level, and can also lock those defaults to the project.

- New projects inherit permissions for the project and its workbooks and data sources from the site’s Default project.

- New workbooks and data sources get the default permissions set on their project.

  When permissions are not locked at the project, its workbook and data source permissions can be modified.

- Views inherit permissions from the workbook. When content permissions are not locked, and the views are not shown as tabs in the workbook, you can edit individual view permissions to differ from the defaults. You cannot modify views shown as tabs.
If you are new to the Tableau permissions model, see *Projects and Content Permissions* for a walkthrough that uses a best practice approach to setting up permissions.
Manage Ownership

When you publish a data source or workbook on Tableau Server or when you create a project, you become its owner. Ownership can be changed. For example, if an employee who is the original owner leaves, the administrator can reassign ownership to another user. After you change ownership, the original owner has no special connection to the item, and their ability to access it is determined by their Tableau Server permissions.

**Note:** You cannot delete a Tableau Server user if the user owns any items. When you attempt to delete the user, their site role is set to Unlicensed. You must first change the ownership of the items and then delete the user.

If you change the ownership of a workbook or data source that has embedded credentials, the embedded credentials will be deleted. You will need to download the workbook or data source, update the embedded credentials for the new owner, and then re-upload the workbook or data source.

Your ability to change or be given ownership depends on your permissions and your relationship to the item, as described in the following table.

<table>
<thead>
<tr>
<th>Item type</th>
<th>Who can change ownership</th>
<th>Who can be given ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projects</strong></td>
<td>Server administrator</td>
<td>Server administrator</td>
</tr>
<tr>
<td></td>
<td>Site administrator</td>
<td>Site administrator</td>
</tr>
<tr>
<td><strong>Workbooks and Data Sources</strong></td>
<td>Server administrator</td>
<td>Server administrator</td>
</tr>
<tr>
<td></td>
<td>Site administrator</td>
<td>Site administrator</td>
</tr>
<tr>
<td></td>
<td>Owner of the item</td>
<td>Member of the site that contains the item (Guest user excluded).</td>
</tr>
<tr>
<td></td>
<td>Project leader for the project</td>
<td></td>
</tr>
</tbody>
</table>
Change a Workbook Owner

By default, the publisher of a workbook is its owner. Administrators, project leaders, and the current owner of the workbook can change ownership. The new owner must be a server administrator or a site administrator, or be any user other than Guest on the same site as the workbook.

To change the owner for a workbook

1. On the Content page for a site, select **Workbooks**.

2. Select one or more workbooks, and then select **Actions > Change Owner**.

3. Type the name of a user or select a user from the list.
4. Click **Change Owner**.

### Change a Data Source Owner

By default, the publisher of a data source is its owner. Administrators, project leaders, and the current data source owner can change ownership. The new owner must be a server or site administrator, or be any user other than Guest on the same site as the data source.

**To change the owner for a data source**

1. On the Content page for a site, select **Data Sources**.

2. Select one or more data sources, and then select **Actions > Change Owner**.
3. Type the name of a user or select a user from the list.

4. Click Change Owner.

Change a Project Owner

By default, the creator of a project is its owner. Administrators can change project ownership. The new owner must be a server administrator or an administrator for the project's
site.

To change the owner for a project

1. On the Content page for a site, select **Projects**.

2. Select one or more projects, and then select **Actions > Change Owner**.

3. Type the name of a user or select a user from the list.
4. Click **Change Owner**.

**View or Edit Permission Rules and User Permissions**

When you specify permissions for a project, workbook, view, or data source, you use a *permission rule* to express who is allowed to work with that resource. Permission rules are the explicit capabilities that can be set for an individual user, or for a group—for each resource.

You work with these rules in the **Permissions** window, described in the steps below. You define permission rules in the upper section. The **User Permissions** section below it shows the effective, or resulting, permissions after Tableau evaluates your rule.

**View or edit a permission rule for a selected content resource**

1. On the Content page for a site, select **Projects**, **Workbooks**, **Views**, or **Data Sources** to display all items of that content type.

2. Select the check box for the item, and then select **Actions > Permissions**.
This shows the current permission rules.

3. To edit a rule, do the following:
   a. Select the actions menu ( . . . ) next to the rule name, and then select Edit.
   b. Click a capability in the rule to set it to Allowed or Denied, or Unspecified.

      See How the permission rules settings work together below for more information.
   c. Click Save.

4. To see the resulting permissions for the selected group or user, do the following:
   a. In the permission rules area, select the group or user name.
   b. In the User Permissions area, hover over a capability box to show a tooltip that indicates the capability name, its resulting setting, and how the result was determined.
The following image shows permissions on a selected workbook for Andrew Allen in the Finance group. The tooltip indicates that a rule assigned to a group he is a member of denies the web edit capability.

How the permission rules settings work together

The sections shown in the Permissions Rules area depend on the type of content you select. The settings described here are those that appear when you select a workbook or view. (Some of these settings are not available until you open a rule for editing, as described in the steps above.) To learn how to set permission rules at the project level, see Set Default Permissions at the Project Level.

- **User / Group**: Lists users or groups that a rule applies to. If the permissions are not locked at the project level, you can click **Add a user or group rule** to configure permissions for those users on the selected content.

- **Permissions**: Lists available permission-role templates for the selected content element. Each template contains a predefined set of capabilities for the rule. If the capabilities selected for the user or group do not match a predefined template, the template name changes to **Custom**. The word Custom appears regardless of how the capabilities are modified.

- **View / Interact / Edit**: These are categories for the groups of capabilities that you
can set to **Allowed**, **Denied**, or **Unspecified**. Setting **Unspecified** evaluates to **Denied** if no other permissions are specified for a user or group on the content.

Although some of the names here are the same as or similar to site or permission role names, the categories here are independent of those things, and they only indicate groups of capabilities that are typically configured as a set.

**User Permissions**

Effective user permissions for a content resource are determined by the following:

- The maximum capabilities allowed for a user’s site role. The site role acts as the "ceiling" for what permissions are allowed. For more information, see Set Users’ Site Roles.

- Whether the user owns the content item

- The evaluation of each user or group permission rule that applies to that user for that content item

For example, if a user is granted Editor-level permissions for a workbook (which allows all available capabilities), but has the site role of Viewer and does not own the workbook, the user will only be allowed the capabilities of View, Export Image, Summary Data, View Comments, Add Comments, and Save.

In the following example, a permission rule has been created for the Finance group. The permission role template of Editor was initially applied to the group, which granted all capabilities. The administrator then set the Save capability to Denied, so the name for the set of permissions applied to the group became Custom. The User Permissions section for the Finance group shows that most of the users in the group have all capabilities, except for the Save capability. One user has even fewer capabilities because that user has a site role of Viewer.
Note that the All Users group permission rule in this example has been set to None, which leaves all of the permissions as Unspecified for the All Users group. This approach requires the administrator to specifically assign permissions for only the groups or users that should see the content.

Use Projects to Standardize Permissions

As an administrator, you can create projects to hold and organize related content resources. Content resources in Tableau Server are workbooks, views, and data sources, and the projects that hold them.

When you’re signed in to Tableau Server, you access projects from the Content page.

Administrators can do the following with projects:
• Create projects.

• Rename projects.

• Change project owners.

• Set permissions for projects, designate a project leader, and set default permissions for workbooks and data sources in the project.

• Lock content permissions.

Project Leader

Users who have the Project Leader permission on a project can do the following tasks with that project and the content published to it:

• Set default permissions to manage access to the project and its content.

• Lock permissions to the project, so publishers cannot change permissions on content they own.

• Move workbooks to another project on which they have Project Leader permissions.

• Change the project’s name.

• Change data source and workbook ownership.

• Run, add, or remove extract refresh schedules.

Note: Users with a site role of Interactor or Publisher get full project leader permissions. A project leader does not have to be the project owner.

Default project and permissions

Tableau creates a Default project with every site. The Default project serves as a template for new projects in that site. Its settings and permissions are applied to new projects you create, including the default settings for the project’s workbooks and data sources.
Similarly, at the project level, you can set default permissions you want to be applied to all workbooks and data sources published to the project.

Locking project content permissions

You can prevent users from changing the permissions for workbooks and data sources in a project. For example, you can deny publishers the option to set permissions on data sources
and workbooks during the publishing process. To do this, you can lock content permissions for that project.

Project permissions can take either of the following states:

- **Locked to the project**: Workbook and data source permissions are set and locked at the project level, and they are applied to all workbooks, views, and data sources in the project. Only administrators can modify the settings. Publishers cannot set permissions on their content during the publishing process.

- **Managed by the owner**: In this (“unlocked”) state, content permissions remain the same as when the project was locked, but the permissions become editable.

  **Note**: If a workbook or data source with editable permissions is moved to a locked project, the default permissions in the locked project are applied to the moved content and its permissions will then be locked.

See also

- Set Default Permissions at the Project Level
- Create Project-Based Permissions.
- Lock Content Permissions to the Project.

Add Projects and Move Content into them

When Tableau Desktop users publish a workbook or data source to a site on Tableau Server, they can select a project to publish it to. If they don’t specify a project, the content goes into the Default project.

Server and site administrators can add or remove projects in a site. In addition, you can move published content from one project to another. A content resource (workbook or data source) can live in only one project. To move content, you need the level of access as described in the following table.
### Required site role and permissions for moving content

<table>
<thead>
<tr>
<th>To move this content type…</th>
<th>…you need this site role…</th>
<th>…and these permissions settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>data source</td>
<td>Server or Site Administrator</td>
<td>The <strong>Move</strong> or <strong>Project Leader</strong> permission on the projects you want to move content to and from.</td>
</tr>
<tr>
<td>workbook</td>
<td>Server or Site Administrator, Publisher, or Interactor</td>
<td></td>
</tr>
</tbody>
</table>
Add a project

1. Click Content > Projects, and then click New Project.

![New Project dialog box](image)

2. Enter a name and description for the project, and then click Create.

You also can include formatting and hyperlinks in the project description. Click Show formatting hints for syntax.

To edit a project, select it to open it, click Details, and then click Edit Description.

Move a workbook or data source into a project

To move content, you need the appropriate level of access, described above in Required site role and permissions for moving content.
The following procedure is specific to workbooks; however, you follow similar steps for data sources on the Data Sources page.

1. Go to the Workbooks page, select one or more workbooks, and then select Actions > Move.
2. Select a different project for the workbook, and then click **Move**.

![Move to Project](image)

Delete a project

When you delete a project, all of the workbooks and data sources in the project are also deleted from the site. If you want to delete a project but not its content, move the content to another project, and then delete the project.

**Note:** You cannot delete the **Default** project.

1. Click **Content > Projects**. In the **Projects** page, select a project, and then select **Actions > Delete**.
2. Click **Delete** in the confirmation dialog box.

Create Project-Based Permissions

As an administrator, you can organize a collection of related workbooks and data sources in a project. You can then control access to that content by creating permission rules for groups of users who need similar access levels to publish or interact with that content.

**Note:** For this scenario, you set the permission rule for the All Users group for the project to **None**, which means that permissions are **Unspecified** for the All Users group.

Preparation

Before you begin creating projects and project-based permissions, document the projects and permission levels that you want users to have in each project.

This roadmap exercise helps you organize permissions to be most efficient to manage over time, and can help you identify any user or permission gaps in your solution. For a best-practice walkthrough on how to implement permissions, see Projects and Content Permissions.
Also read the following topics in the Tableau Server Help:
- Content Access and Ownership and permissions-related topics
- Use Projects to Standardize Permissions and projects-related topics
- Set Web Edit, Save, and Download Access on Content

Step 1: Create projects and user groups

1. Sign in to Tableau Server with your administrator user name and password.
2. On the Projects page, click **New Project**.
3. Click **Groups**, and then click **New Group**.

   Create groups that correspond to each project and access level. For example, for a project that allows users only to access the views, you might use a name similar to Project1_Visitor. For a project that allows interaction with the views, Project1_Interactive.

4. Click **Users**, and then click **Add Users**. Select one or more users in the list, select **Actions > Group Membership**, and then select a group for the users. Click **Save** to confirm the group membership.

   Repeat this step to add users to other groups.

Step 2: Assign permissions at the project level

After you set up your projects and user groups, you can start assigning permissions. Repeat these steps for each project. Also see Set Default Permissions at the Project Level.

1. On the Projects page, select a project, and then select **Actions > Permissions**.
2. For the **All Users** group permission rule, set the permission role template to **None**.

   Click the actions menu ( . . . ) next to **All Users**, and then click **Edit**. Select **None** for **Project, Workbooks, and Data Sources**, and then click **Delete**. This means that all capabilities will be set to **Unspecified**.

3. Click **Add a user or group rule**, select **Group**, and then select the group name in
the list.

To edit an existing rule, click the actions menu (…) next to the permission rule name, and then click Edit.

4. Select a permission role template for **Project, Workbooks**, and **Data Sources** to specify a predefined set of capabilities for the group or user.

5. To further change capabilities included in the rule, click a capability in the rule to set it to **Allowed** or **Denied**, or leave it **Unspecified**.

Click **Save** when you are done.

Repeat steps 3-5 for each group or user requiring project permissions.

**Note:** You can optionally lock content permissions to the project to enforce the default permissions for all content in the project. This overwrites any previous permissions assigned to workbooks and views in the project. For more information, see **Lock Content Permissions to the Project**.

Step 3: Check project permissions

- View the resulting user permissions.

Click a group name or user name in the permission rules list to see the resulting permissions. Hover over a capability box to see a tooltip with details on whether a capability is allowed or denied.

When you publish workbooks to the project, the permissions are updated accordingly.

For information on granting Save permissions to users, see **Set Web Edit, Save, and Download Access on Content**.
Set Default Permissions at the Project Level

As an administrator or project leader, you can set a project’s permissions, as well as the default permissions that will be set on workbooks and data sources published to it.

Notes on default permissions in locked projects

You can choose to have the default permissions apply to all workbooks and data sources in a project, and ensure that no one can change those settings, by locking content permissions to the project. For more information, see Lock Content Permissions to the Project.

- Workbooks and data sources in a locked project always use the default permissions set for content in that project. Views in a locked project always use the workbook permissions. This applies to workbooks and data sources when they are being published from desktop.

- Administrators and users with the Project Leader permission can always edit default permissions, even when a project is locked.

- Users, including content owners, cannot edit individual workbook, view, and data source permissions when content is locked to the project.

To set default permissions in a project

1. In the Content page of a site, click a project, and then click Permissions in the project place page.
2. Click **Add a user or group rule**, select **Group** or **User**, and then select the group or user name from the list.

For an existing user or group, click the actions menu ( . . . ), and then click **Edit**.
3. Select a permission role template for **Project**, **Workbooks**, or **Data Sources**, and then click **Save**.

Or, to create a custom set of capabilities, click the **Project**, **Workbooks**, or **Data Sources** labels to expand the permissions view. Click capabilities to set them to **Allowed**, ** Denied**, or **Unspecified**. Click **Save**.
This example shows how to set project permissions. The same general steps apply for workbooks and data sources.

**Note:** To change the settings after saving, click the actions menu (…), and then click **Edit**.

4. View the user permissions, which are the effective permissions.

Click a group name or user name in the permission rules to see the resulting user permissions.
Expand the Project, Workbooks, or Data Sources permissions views to see individual capabilities.

Hover over a capability box to see a tooltip with details on whether a capability is allowed or denied.
5. Follow the same steps to configure additional permission rules for more users or groups.

See also

Content Access and Ownership

Use Projects to Standardize Permissions

Projects and Content Permissions

Lock Content Permissions to the Project

As an administrator or project leader, you can prevent users from changing the permissions for workbooks and data sources in a project. To do so, you can lock content permissions for that project.

When permissions are locked to the project, the default permission settings are applied to all workbooks, views, and data sources in a project and cannot be modified by users (including content owners). When permissions are managed by the owner ("unlocked"), content per-
missions remain the same as when the project was locked, but the permissions become editable.

**Note:** Owners always get full access to the content they’ve published, but can only change permissions for their workbooks and data sources when the parent project permissions are not locked.

For information on default permissions, see Set Default Permissions at the Project Level. For a best-practice walkthrough on how to implement permissions, see Projects and Content Permissions.

**Note:** Administrators and project leaders can set and edit default permissions for the project, and its workbooks and data sources when it is locked.

1. In the Content page of a site, open a project, and then click **Permissions** in the project place page.

2. Click the **Managed by the owner** button.
The padlock icon on the button label indicates whether content permissions are currently locked to the project or managed by the content owner.

3. In the **Content Permissions in Project** dialog box, select **Locked to the project**, and then click **Save**.

![Content Permissions in Project dialog box](image)

When permissions are locked to the project, users can view workbook or data source permissions in the project, but they cannot modify them.

4. To unlock content permissions for the projects, open the project permissions again.
   Click the **Locked to the project** button. In the **Content Permissions in Project** dialog box, select **Managed by the owner**, and then click **Save**.
The default permissions are reapplied to workbooks and data sources in the project, and their permissions are now editable.

Set Permissions for a Project

Every project includes permissions that can be set for the project, and for its workbooks and data sources. These permissions become the default permissions settings for all content in the project, and each project can have its own set of default permissions. For more information, see Set Default Permissions at the Project Level.

Administrators and users with the Project Leader permission can lock content permissions to a project. For more information, see Quick Start: Lock Project Permissions, Lock Content Permissions to the Project.

For more information on working with permissions, see Content Access and Ownership and Use Projects to Standardize Permissions.
**Note:** When you create a new project, it initially will have the same permissions as the **Default** project in the site, which are the default permissions for the project, and its workbooks and data sources.

The three capabilities you can set specifically for a project are: **View**, **Save**, and **Project Leader**.

<table>
<thead>
<tr>
<th>Capability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>View</strong></td>
<td>Allows the user or group to view the workbooks and views in the project. The View capability must also be allowed for the individual workbooks and views in the project.</td>
</tr>
<tr>
<td><strong>Save</strong></td>
<td>Allows the user or group to publish workbooks and data sources to the server and overwrite content on the server. The Save capability must also be allowed for the individual workbooks and data sources in the project. When allowed, the user with a site role that supports publishing can re-publish a workbook or data source from Tableau Desktop, thereby becoming the owner and gaining all permissions.</td>
</tr>
</tbody>
</table>
Subsequently, the original owner’s access to the workbook is determined by that user’s group permissions and any further permissions the new owner might set.

This permission also determines the user’s or group’s ability to overwrite a workbook after editing it on the server. For related information, see Set Web Edit, Save, and Download Access on Content.

| Project Leader | Allows the user or group to set permissions for all items in the project, lock project permissions, and edit default permissions. |

To set permissions for the project

1. On the Projects page, select a project, and then select **Actions > Permissions**.

2. Click **Add a user or group rule**, select **Group** or **User**, and then select the group or user name from the list.
3. Select a permission role template to apply an initial set of capabilities for the group or user, and then click **Save**.

The available permission role templates for projects are:

<table>
<thead>
<tr>
<th>Template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewer</td>
<td>Allows the user or group to view the workbooks and views in</td>
</tr>
<tr>
<td>Role</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Publisher</td>
<td>Allows the user or group to publish workbooks and data sources to the server.</td>
</tr>
<tr>
<td>Project Leader</td>
<td>Allows the user or group to set permissions for all items in a project.</td>
</tr>
<tr>
<td>None</td>
<td>Sets all capabilities for the permission rule to <strong>Unspecified</strong>.</td>
</tr>
<tr>
<td>Denied</td>
<td>Sets all capabilities for the permission rule to <strong>Denied</strong>.</td>
</tr>
<tr>
<td>Data Source Connector</td>
<td>Allows the user or group to connect to data sources in the project.</td>
</tr>
<tr>
<td>Data Source Editor</td>
<td>Allows the user or group to connect to, edit, download, delete, and set permissions for a data source in the projects. They can also publish data sources, and as long as they are the owner of a data source they publish, can update connection information and extract refresh schedules. This permission is relevant for views when the view they access connects to a data source.</td>
</tr>
</tbody>
</table>

4. To further customize the rule, click the actions menu (… ) next to the permission rule name, and then click **Edit**. Click a capability in the rule to set it to **Allowed** or **Denied**, or leave it **Unspecified**. Click **Save** when you are done.
5. View the resulting permissions.

Click a group name or user name in the permission rules to see the resulting permissions. Hover over a capability box to see a tooltip with details on whether a capability is allowed or denied.
6. Follow the same steps to configure additional permission rules on the content for more users or groups.

Quick Start: Lock Content Permissions to a Project

As an administrator or project leader, you can lock content permissions in a project to prevent users from changing the permissions of any content in the project. When permissions are locked to the project, the default permissions are applied to all workbooks and data sources in a project and cannot be modified by users (including the content owners).
Note: Content owners always get full access to the content they've published, but cannot change permissions for their workbooks and data sources when the parent project permissions are locked.

For related information on setting permissions, see Manage permissions. For more information on setting default permissions and locking content permissions to the project, see Set Default Permissions at the Project Level and Lock Content Permissions to the Project. For a best-practice walkthrough on how to implement permissions, see Projects and Content Permissions.

1 Set Default Permissions for the Project

Because the content inside locked projects always uses the default permissions, first verify that your default permissions are set appropriately. In a site, click Content > Projects. Open a project, and then click Permissions. Add a user or group and select a permission role template for that content type, or click Edit, and then set capabilities to Allowed, Denied, or Unspecified.
Administrators and Project Leaders can edit default permissions at any time.

2 Lock Content Permissions to the Project

In a project's permissions, click the Managed by the owner button. The button label indicates whether content permissions are currently locked to the project or managed by the content owner. Select Locked to the project, and then click Save.
When permissions are locked to the project, all content in the project uses the default permissions. No users can change permissions for individual workbooks (including views) or data sources in the project.

3 View Locked Permissions

Open a project, select a workbook or data source in the project, and then click **Actions > Permissions**. When permissions are locked to the project, users can view workbook or data source permissions in the project, but they cannot modify them.
In this example, the workbook owner has full permissions for the workbook, but cannot change the workbook permissions while they are locked to the project.

4 Unlock Content Permissions for the Project

In a site, click **Content > Projects**. Select a project, and then click **Actions > Permissions**. Click the **Locked to the project** button. Select **Managed by the owner**, and then click **Save**.
When a project's content permissions are **Managed by the owner**, individual workbooks, views, and data sources in the project start with the default permissions and can be modified by users.

Notes on project permissions:

- Only administrators and project leaders can lock content permissions, and set and edit default permissions in a project.

- Administrators and project leaders can edit default permissions for the project, its workbooks, and its data sources at any time, at the project level.

- Individual workbook, view, and data source permissions cannot be edited by users (including content owners) when a project is locked.

- Workbooks and data sources in a locked project always use the default permissions. Views in a locked project always use the workbook permissions.

**Set Permissions on Individual Content Resources**

As an administrator, or as a user granted the **Set Permissions** capability on a specific resource, you can change permissions on that resource (data source or workbook).

Generally we recommend setting permissions at the project level for all content in the project. A reason you might want to deviate from this practice, for example, is to explicitly deny the some capabilities on a data source or workbook that has a data source or user filter that enables a form of row-level security.

**In this article**

Capabilities you can set on data sources

Capabilities you can set on workbooks and views

Set permissions on a content resource
Capabilities you can set on data sources

Use permission rules to set the following capabilities for a data source:

<table>
<thead>
<tr>
<th>Capability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>View</td>
<td>View the data source on the server.</td>
</tr>
</tbody>
</table>
| Connect                         | Connect to the data source. The **Connect** permission allows a user to connect to a data source from an editor (in Tableau Desktop or Tableau Server web editing).

**Note:** If a workbook author embeds credentials in a workbook or view, users who also have the **Web Edit** permission will be able to access to the workbook’s data source regardless of their **Connect** permissions.

| Save                            | Publish data sources to the server and overwrite data sources on the server. |
| Download Data Source            | Download the data source from the server.                                  |

**Note:** Cube data sources, like those for Microsoft Analysis Services or Oracle Essbase connections, must be used locally. To download the published data source to Tableau Desktop, the user must have the **Download** capability. You must explicitly grant the **Download** permissions regardless of the permissions role you apply. For more information, see
Cube Data Sources.

<table>
<thead>
<tr>
<th>Delete</th>
<th>Delete the data source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Permissions</td>
<td>Grant or deny permissions for the data source.</td>
</tr>
</tbody>
</table>

Permission role templates for data sources

<table>
<thead>
<tr>
<th>Template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>Allows the user or group to connect to the data source on the server.</td>
</tr>
<tr>
<td>Editor</td>
<td>Allows the user or group to connect to, download, delete, and set permissions on data sources on the server. They can also publish data sources, and as long as they are the owner of a data source they publish, they can update connection information and extract refresh schedules. (The latter two capabilities are no longer available if an administrator or project leader changes data source ownership.)</td>
</tr>
<tr>
<td>None</td>
<td>Sets all capabilities for the permission rule to <strong>Unspecified</strong>.</td>
</tr>
<tr>
<td>Denied</td>
<td>Sets all capabilities for the permission rule to <strong>Denied</strong>.</td>
</tr>
</tbody>
</table>

Capabilities you can set on workbooks and views

The list of capabilities and the available permission role templates vary depending on whether you are setting permissions for a workbook or a view. For information about capability definitions, see Permissions Reference.
Editing view-level permissions

When a Tableau Desktop author publishes a workbook with the **Show Sheets as Tabs** enabled, these tabbed views take on the workbook permissions rules. Changes you make to the workbook permissions affect all of its tabbed views.

To edit an individual view’s permissions, save the workbook again without tabs (or hide sheets). The default permissions are applied to the workbook, and you can then edit view permissions.

We recommend that you set view-level permissions sparingly, as an exception. Try to manage permissions at the project level as much as possible. When permissions are locked to a project, views in a workbook use the workbook permissions.

Permission role templates for workbooks and views

<table>
<thead>
<tr>
<th>Template</th>
<th>Applies to...</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewer</td>
<td>workbooks views</td>
<td>Allows the user or group to view the workbook or view on the server.</td>
</tr>
<tr>
<td>Interactor</td>
<td>workbooks views</td>
<td>Allows the user or group to view the workbook or view on the server, edit workbook views, apply filters, view underlying data, export images, and export data. All other permissions are inherited from the user’s or group’s project permissions.</td>
</tr>
<tr>
<td>Editor</td>
<td>workbooks views</td>
<td>Sets all capabilities for the rule to <strong>Allowed</strong>.</td>
</tr>
<tr>
<td>None</td>
<td>workbooks views</td>
<td>Sets all capabilities for the rule to <strong>Unspecified</strong>.</td>
</tr>
<tr>
<td>Denied</td>
<td>workbooks views</td>
<td>Sets all capabilities for the rule to <strong>Denied</strong>.</td>
</tr>
</tbody>
</table>
Set permissions on a content resource

1. In the Data Sources, Workbooks, or Views page, select the check boxes for each resource, and then select **Actions > Permissions**.

   The following image shows how this looks on the Data Sources page.

   ![Image of Data Sources page with Actions menu open](image)

   **Note:** If you select multiple items and some of the items are read-only, you cannot view the permissions. Instead, select one item at a time.

2. Click **Add a user or group rule**, select **Group** or **User**, and then select the group or user name from the list.
3. Select a permission role template to apply an initial set of capabilities for the group or user, and then click **Save**.

4. To further customize the rule, click the actions menu ( . . . ) next to the rule name, and then click **Edit**. Click a capability in the rule to set it to **Allowed** or **Denied**, or leave it unspecified. Click **Save** when you are done.
5. Configure any additional rules you want for other users or groups.

6. View the resulting permissions.

Click a group name or user name in the permission rules to see the resulting permissions. Hover over a capability box to see a tooltip that shows whether a capability is allowed or denied, and what determined that result.
See also

How data access is evaluated for workbooks that connect to Tableau data sources

How Permissions are Evaluated

Permissions in Tableau Server are assigned to content resources—projects, workbooks, data sources, and sometimes to individual views. You use permission rules to specify who can work with a content resource.

What users can access and the actions available for each content type, are determined by the following:

- **Site role.** A user’s site role determines whether a user can publish, interact with, or only view resources. For more information, see Set Users’ Site Roles.

- **Content permissions.** Every project, workbook, data source, or view can have a unique set of permission rules.

  A permission rule includes the user or group, and the set of capabilities you want to grant users for a resource (such as the ability to edit a view). Each permission role template (such as Editor, Interactor, Viewer) specifies a predefined set of capabilities for the rule. If the capabilities that are selected do not match a predefined template, the permission role template changes to Custom.

  Available capabilities vary depending on the resource. Capabilities can be set to Allowed, Denied, or Unspecified. Denied always takes precedence over Allowed, and Unspecified results in Denied if no other permission rules allow a capability for a user.

- **Ownership.** Content owners always get full access to the content they've published. In projects with locked permissions, content owners cannot edit permissions for their workbooks and data sources.
Users with the **Set Permissions** capability can change permissions for content items in projects that aren’t locked. Administrators, content owners, and users with the **Project Leader** capability automatically have the **Set Permissions** capability.

You can set permission rules for an individual user or group for each resource. This diagram illustrates how permission rules are evaluated in Tableau Server.

A user’s effective permissions for a given content resource are determined by the following:

- The maximum capabilities allowed through the site role.
- Whether the user owns the content item.
- The result after Tableau evaluates permission rules applied to that user and all groups the user is a member of.

**Notes on permissions**

- Server and site administrators can access all the resources in a site with full permissions.
- You cannot set permissions at the site level; permissions are assigned to resources only.
- As content owners, publishers get full access to their content. Administrators can manage permissions on content after it’s published.

Another option for practicing content governance is to lock permissions at the project level. This does not change publishers’ ownership of the content they publish after the
project is locked. However, it enables default permissions for the users and prevents publishers from being able to change those default permissions during the publishing process. See Lock Content Permissions to the Project.

- Individual user permissions on resources take precedence over group permissions on resources. In other words, user permissions trump group permissions.

- Workbook permissions serve as templates for view permissions. When content permissions are locked to the project, and when a workbook uses tabbed views, views inherit their workbook permissions. When permissions are not locked, and when a workbook is saved without tabs, the workbook and view permissions can be edited independently.

- Project default permissions serve as templates for content in a project. When content permissions are locked to the project, the workbooks and data sources always use the default permissions. When permissions are not locked, workbook and data source permissions can be edited independently.

- For each content item, every site user is automatically included in the All Users group. As a result, the All Users permission rule affects how permissions are evaluated for users when you create additional group permission rules for that content item.

If you use Tableau Server in an environment where openly sharing knowledge and information across the organization is important, set the permission rule for the All Users group in the Default project to the Publisher permission template. Users can publish to and consume content from new projects.

If you use Tableau Server in an environment where restricting access is important, set the permission rule for the All Users group in the Default project to the role of None. Then, add explicit permissions for groups and users to allow them to publish and work with content in new projects.
The order of precedence in which Tableau evaluates permissions

1. **Server and Site Administrator**: Administrators can access all site content with full permissions.

2. **User - Unlicensed, Viewer license, or Guest**: If a user is Unlicensed, has a Viewer license (different than Viewer site role), or is a Guest, there are certain capabilities they are never allowed to perform. If the capability is explicitly denied for the user because of licensing, they are denied.

3. **Project Owner**: If the user owns the project that contains the content, the capability is allowed. Otherwise,

4. **Project Leader**: If the user has the Project Leader capability, or is in a group that has the Project Leader capability, they are allowed. If the user is explicitly denied the Project Leader capability, they are denied. Otherwise,

5. **User - Authorizable Owner**: If the user is the owner of the content, they are allowed. Otherwise,

6. **User - Capability Denied**: If the user has been explicitly denied the capability for the content, they are denied. Otherwise,

7. **User - Capability Allowed**: If the user has been explicitly allowed the capability for the content, they are allowed. Otherwise,

8. **Group - Capability Denied**: If the user belongs to a group that has been explicitly denied the capability for the content, they are denied. Otherwise,

9. **Group - Capability Allowed**: If the user belongs to a group that has been explicitly allowed the capability for the content, they are allowed. Otherwise,

10. The user is denied access to the content.
Permissions Reference

Administrators and other authorized users can allow or deny capabilities on content published to Tableau Server. When permissions are not locked to a project, Tableau Desktop users who publish to that project can set permissions on their content during the publishing process.

<table>
<thead>
<tr>
<th>In this article</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site and permissions roles that allow full content access</td>
</tr>
<tr>
<td>Capabilities available for each content type</td>
</tr>
<tr>
<td>How data access is evaluated for workbooks that connect to Tableau data sources</td>
</tr>
</tbody>
</table>

Site and permissions roles that allow full content access

The following list describes roughly who gets full access to content on the server and the scope of that access:

- Server administrators (Tableau Server only) are allowed all capabilities on all content published to the server.
- Site administrators are allowed all capabilities on content published to the site.
- Groups to which you apply the Project Leader role are allowed all capabilities on content in the project.
- Publishers become the owners of content they publish, and they are allowed all capabilities on that content, with the exception of setting permissions in locked projects.

Capabilities available for each content type

The following table shows how permissions apply to content and describes each capability.
<table>
<thead>
<tr>
<th>Permission</th>
<th>Applies to…</th>
<th>When allowed, users can…</th>
</tr>
</thead>
<tbody>
<tr>
<td>View 🎨</td>
<td>workbooks, data sources, views, projects</td>
<td>Open the item on Tableau Server. <strong>Note:</strong> When a workbook is configured to show sheets as tabs, all views use the workbook permissions, even if different permissions are specified on an individual view.</td>
</tr>
<tr>
<td>Web Edit ✒️</td>
<td>workbooks, views</td>
<td>Edit views in workbooks. For information, see Set Web Edit, Save, and Download Access on Content.</td>
</tr>
<tr>
<td>Save 🕰️</td>
<td>workbooks, data sources, views, projects</td>
<td>Overwrite the resource on the server. When allowed, the user can re-publish a workbook or data source from Tableau Desktop, thereby becoming the owner and gaining access to all permissions. Subsequently, the original owner’s access to the workbook is determined by that user’s group permissions and by any further permissions the new owner might set. This capability also determines the user’s or group’s ability to overwrite a workbook after editing it on the server. Special consideration for the <strong>All Users</strong> group: To help protect an owner’s content from being overwritten by another user (via publishing from Tableau Desktop or saving a web-edited workbook on the server), when a user publishes into a project where the <strong>All Users</strong> group has permissions, the <strong>Save</strong> permission for the <strong>All Users</strong> group is changed from...</td>
</tr>
<tr>
<td>Permission</td>
<td>Applies to…</td>
<td>When allowed, users can…</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Download Workbook/Save As</td>
<td>workbooks</td>
<td>Allowed to Unspecified by default. You can then manually modify this capability if you want to allow it.</td>
</tr>
<tr>
<td>Download Data Source</td>
<td>data sources</td>
<td>Download the data source from the server.</td>
</tr>
<tr>
<td>Delete workbooks/data sources</td>
<td>workbooks</td>
<td>Delete the content resource.</td>
</tr>
<tr>
<td>Delete views</td>
<td>viewss</td>
<td></td>
</tr>
<tr>
<td>Filter workbooks/views</td>
<td>Modify filters in the view, keep only filters, and exclude data.</td>
<td></td>
</tr>
<tr>
<td>Add Comments workbooks/views</td>
<td>Add comments to views in a workbook.</td>
<td></td>
</tr>
<tr>
<td>View Comments workbooks/views</td>
<td>View the comments associated with the views in a workbook.</td>
<td></td>
</tr>
<tr>
<td>Permission</td>
<td>Applies to...</td>
<td>When allowed, users can...</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Download Summary Data</td>
<td>workbooks</td>
<td>View the aggregated data in a view, or in the user’s selection within the view, and download that data as a text file.</td>
</tr>
<tr>
<td></td>
<td>views</td>
<td></td>
</tr>
<tr>
<td>Download Full Data</td>
<td>workbooks</td>
<td>View the underlying data behind each row in a view, as restricted by any marks the user has selected, and download the data as a text file.</td>
</tr>
<tr>
<td></td>
<td>views</td>
<td></td>
</tr>
<tr>
<td>Download Image/PDF</td>
<td>workbooks</td>
<td>Download each view as an image.</td>
</tr>
<tr>
<td></td>
<td>views</td>
<td></td>
</tr>
<tr>
<td>Share Customized</td>
<td>workbooks</td>
<td>Users can save customizations they’ve made to a view using the interaction features (such as filters). They can then share their custom view for others to see.</td>
</tr>
<tr>
<td></td>
<td>views</td>
<td>Customization in this way does not change the view’s default state or its underlying data.</td>
</tr>
<tr>
<td>Move</td>
<td>workbooks</td>
<td>Move workbooks between projects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Only administrators can move data sources between projects.</td>
</tr>
<tr>
<td>Set Permissions</td>
<td>workbooks</td>
<td>Specify permissions for the resource. Views in a workbook take permissions set at the workbook level.</td>
</tr>
<tr>
<td></td>
<td>data sources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>views</td>
<td></td>
</tr>
<tr>
<td>Permission</td>
<td>Applies to...</td>
<td>When allowed, users can...</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Connect            | data sources  | Connect to a published data source from Tableau Desktop or the server’s web editing environment.  
                             See also: How data access is evaluated for workbooks that connect to Tableau data sources |
| Project Leader     | projects      | Set permissions for all resources in a project and for the project itself. Can lock project permissions and edit default permissions. Also can change content owner, move content, and run refresh schedules. |

How data access is evaluated for workbooks that connect to Tableau data sources

When a Tableau Desktop user publishes a workbook that connects to a data source published to the server (a Tableau data source), the user can set the data authentication type to **Embed password** or **Prompt users**. In this specific publishing case, data authentication refers to the workbook’s connection to the Tableau data source. This is independent of the authentication set in the published data source’s connections to the underlying data.

When a user subsequently opens the workbook on the server, the workbook-specific data authentication is evaluated along with the **Connect** capability, set in permissions rules. Whether the user can see the data in the workbook is determined as follows:

- When the workbook publisher selects the **Embed password** option, they effectively embed their own **Connect** permissions, allowing anyone who can view the workbook to see the data it connects to. How the viewer’s **Connect** capability is set on the data source does not affect this outcome.

- When the publisher selects the **Prompt users** option, viewers who are allowed the
**Connect** capability are on the data source are prompted for their credentials. Users who are denied the **Connect** capability are denied access the data.

The following table summarizes the two bullet points above.

<table>
<thead>
<tr>
<th>Workbook Data source authentication</th>
<th>Connect capability</th>
<th>Resulting access to data in the workbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded password or Prompt user</td>
<td>Allowed or Denied</td>
<td>Allowed through the workbook publisher’s Connect capability set on the data source</td>
</tr>
<tr>
<td>Prompt user</td>
<td>Embedded password</td>
<td>Allowed through the viewer’s Connect capability</td>
</tr>
<tr>
<td></td>
<td>Allowed</td>
<td>Allowed through the viewer’s Connect capability</td>
</tr>
<tr>
<td></td>
<td>Denied</td>
<td>Denied</td>
</tr>
<tr>
<td>Prompt user</td>
<td>Allowed</td>
<td>Viewer is prompted for database credentials</td>
</tr>
<tr>
<td></td>
<td>Denied</td>
<td>Denied</td>
</tr>
</tbody>
</table>

**Manage Data**

**Tableau Server Data Sources**

A Tableau data source consists of metadata that describes the following:

- **The connection information** that defines the data you want to bring in to Tableau for analysis.

- **Customization and cleanup** that helps you and others use the data source efficiently. For example, calculations, sets, groups, bins, and parameters, custom field formatting, and so on.
• **Information about how to access or refresh the data**, such as a path to an Excel file, credentials for accessing data on-premises or in the cloud, and so on.

A data source can be published on its own, after which it can be shared with other users, who can connect to from their own workbooks. A data source can also be published as a part of a workbook (embedded), where it remains available only from within that workbook. To learn more about publishing data sources and the benefits this provides to your data analysts and consumers, see the topics under *Publish Data Sources and Workbooks* in the Tableau Desktop Help.

Using Tableau data sources offers advantages for administrators as well. Because multiple workbooks can connect to one data source, you can minimize data source proliferation and save on storage space and processing time. When someone downloads a workbook that connects to Tableau data source, extracts it connects to stay on the server, resulting in less network traffic. Finally, if a database driver is required for a connection in the data source, you need to install and maintain the driver only on the server if you use Tableau Server on-premises, instead of on each user’s computer. All supported drivers are installed on Tableau Online.

**Managing data sources**

Administrators and data source owners can perform management tasks on published data sources. A best practice is to designate a person with administrator-level access to manage all data sources published to a project or to the whole site, so that all data sources can be maintained under the same set of guidelines.

To perform these tasks, do the following:

1. Sign in to the site as an administrator or owner of the data source you want to work with.

   **Note:** Some tasks are available only to administrators, as described below.

2. Go to the **Data Sources** page, select the check box next to the data source, and in
the upper-left of the Data Sources page, select Actions.

- **Edit and view permissions**: Permissions can specify which users or groups can connect to, modify, or download data sources. For information, see Set Permissions on Individual Content Resources.

- **Edit connection information**: Update embedded credentials or other metadata that describes the connections to the underlying data.

- **Create a new workbook or download**: You can start a new workbook in the browser environment by connecting to a Tableau data source. Or download the data source to use locally.

- **Change the data source owner**

- **View the data source’s revision history**

- **Refresh extracts**: If a data source includes an extract, you can assign the extract to a refresh schedule.

  For information, see Refresh Data on a Schedule.
• **Add or remove keyword tags:** Tags can contain a single word or multiple words, delimited by a comma.

• **Delete:** Deleting a data source affects workbooks that connect to the data source. Before you delete a data source, ensure that there are no workbooks that connect to the data source or edit the workbooks to use another data source.

• **Move:** Only administrators can move a data source from one project to another.

In addition, for data sources that are proxy connections, administrators can stay aware of how users authenticate to the database, and whether the appropriate drivers are installed. For information, see Database Drivers and Data Security.

**View Data Source Attributes**

On the **Data Sources** page, you can filter the view to data sources or connections and see attributes for each.

**View data sources by name**

To filter by data source name, in the **View** list, select **Data Sources**.

![Data Sources view](image)

Attributes in the data source name list include the following:

• **Icon/Name**—The icon next to the data source name indicates whether the data source is published (●) or embedded in a workbook (●).
- Select the name of a published data source to open its data source page, with tabs for viewing connections and workbooks that connect to it.

- Select the name of an embedded data source to open the workbook associated with it, as well as tabs for viewing other data it connects to.

- **Connects To**—Indicates the name of the database server or data file. This could be a database outside of Tableau Server, an extract, or a published data source.

- **Live or Last Extract**—This column tells you whether the connection to the data is live, or, if it is a connection to an extract, when the extract was last updated.

**View a list of connections**

To filter by connection type, in the View list, select **Connections**.

Connection attributes include:

- **Connects to**—Indicates the name of the database server or data file. This could be a database outside of Tableau Server, an extract, or a published data source.

- **Connection type**—Shows the type of data. **Tableau Server** indicates that the connection is to a data source published on the site. **Tableau Data Engine** means the data source has an extract stored on the Tableau data server.

**Keep Data Fresh**
Manage Refresh Tasks

Administrators can change the priority or schedule of a scheduled refresh, a refresh manually, or delete schedules. You can do this on the Tasks page:

1. Sign in to the site that has the schedules you want to manage, and then click Tasks.

2. On the Tasks page, do any of the following:
   - Click Change Schedule, and select a new schedule from the list.
   - Select Run Now to initiate the refresh manually.
   - Note: If an extract does not have a scheduled refresh, you can refresh it on demand from the Data Connections page.
   - Select Change Priority, and enter a new number between 1 and 100 to move the extract up or down in the priority list.
   - Select Delete to completely remove the schedule for the selected data sources.

See also

Enable Extract Refresh Scheduling and Failure Notification

Refresh Data on a Schedule

You can set scheduled refresh tasks for published data source extracts and published workbooks that connect to data extracts.
1. When you’re signed in to Tableau Server, display Content > Data Sources or Content > Workbooks, depending on the type of content you want to refresh.

2. Select the check box for the data source or workbook you want to refresh, and then select Actions > Extract Refresh.

3. In the Refresh Extracts dialog, select Schedule a Refresh, and complete the following steps:

   - Select the schedule you want.

   - If available, specify whether you want a full or incremental refresh.

   By default, and if this option is not shown, a full refresh is run. Incremental refresh is available only if you configured it in Tableau Desktop before publishing the extract. For information, see Refreshing Extracts in the Tableau Desktop Help.
• Click the **Schedule Refresh** button.

![Refresh Extracts Image]

**Note:** If you want to add a new schedule, you can do so on the **Schedules** page.

**Quick Start: Manage Incremental Extracts**

When you publish a workbook that has an incremental extract, you can associate it with up to two refresh tasks that Tableau Server will handle for you: An incremental refresh of the extract and a full refresh. After you publish the workbook, you or a Tableau Server administrator can modify any tasks that are associated with the workbook. You can also delete tasks or add more.

1 **Publish and Assign a Schedule**

In Tableau Desktop, after you create a workbook that uses an extract, go to **Server > Publish Workbook**, and click **Scheduling & Authentication**. Next, choose schedules for your refreshes and click OK.
After you publish in Tableau Desktop and choose your refresh schedules, Tableau Server handles the refresh tasks for you.

2 Select the Workbook

To modify a workbook's scheduled task, sign in to Tableau Server and on the Workbooks page, select the workbook:
3 Access the Refresh Schedule

Click **Refresh Schedule**.

Select the check box for the refresh task you want to modify:

<table>
<thead>
<tr>
<th>Refresh Type</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full refresh</td>
<td>End of the month – 0</td>
</tr>
<tr>
<td>Incremental refresh</td>
<td>Saturday night – Wed</td>
</tr>
</tbody>
</table>
4 Edit, Delete, or Add More Tasks

Select the action you want to take—for example, Change Schedule—and make your selection. You can also delete the task, change its priority, or add more refresh tasks.

Quick Start: Refresh Extracts on a Schedule

For published workbooks that connect to data extracts, you can set up the server to refresh the data on a recurring schedule, so all workbooks connected to them always show the most up-to-date data.

To schedule refreshes you need to have administrator or data owner permissions.

1 Set up a schedule on the server

Sign in to the server, go to the Schedules page, and click New Schedule.
Tableau provides a few refresh schedules. You create additional schedules you need.

2 Enable scheduled extract refreshes and failure emails

As a server or site administrator, you can enable schedules, as well as email notification when extract refreshes fail.

Select **Settings**, and then go to the **General** page.

- Under Email Notification, select **Send email to data source and workbook owners when scheduled refreshes fail**.

- Under **Embedded Credentials**, select both check boxes to allow publishers to
embed credentials and schedule extract refreshes.

3 Publish a workbook with an extract

In Tableau Desktop, select Server > Publish Workbook. Sign in to the server if you’re not already. In the Publish Workbook to Tableau Server dialog box, click Schedules & Authentication. Under Extract Schedule, select the schedule from the list.
If the original data requires authentication, you will also need to select how you want people to access it.

4 Monitor refresh performance

You can monitor scheduled tasks by viewing **Background Tasks for Extracts** on the **Status** page.
Automate Refresh Tasks

You can associate extract refresh tasks with schedules in Tableau Server to automate refreshing data extracts. You can also automate extract refreshes using tabcmd, a command line utility that you can download for use with Tableau Server. In particular, you can use the refreshextracts command in combination with other commands in your own script. For example:

```
tabcmd login - http://mytabserver -u jsmith -p P@ssw0rd!
refreshextracts --datasource salesq4
```

For information about downloading the tabcmd utility, see tabcmd.

Handle Extract Refresh Alerts

When Tableau Server cannot complete a scheduled refresh, an alert appears to indicate that the refresh has failed. If a scheduled refresh fails five consecutive times, Tableau Server suspends the refresh. When a refresh is suspended, Tableau Server does not try to run it again until someone takes an action that attempts to correct the cause of the failure.

**Note:** The number of consecutive failures for a refresh is set to five by default, but can be changed by a Tableau Server administrator, using the `tabadmin set backgrounder.failure_threshold_for_run_prevention` command. For more information, see tabadmin set options.

You will see the Alerts menu only if an extract refresh failed and you are:

- A system or site administrator
- The author of the workbook or data source that couldn't be refreshed
The author of a workbook that connects to a data source that couldn’t be refreshed

When you open the Alerts menu you can see more information about the refresh failure(s):

When a **Data source** is listed as **Embedded** it means that the data source definition (which includes things like the data source credentials or the database name) is embedded, or resides, within the workbook itself, originally created in Tableau Desktop.

When a data source name or workbook name is listed as the **Data source** (for example, **Data source: sales_data**), it means that the data source is a Tableau Server data source. The data source definition resides on Tableau Server.

In the Data pane on Tableau Desktop, you can determine whether the data source is on Tableau Server or is local. If the data source is on the server, a Tableau icon is displayed next to the data source name instead of a database icon:
Resolving Extract Refresh Problems

To resolve refresh issues, you can take any of these actions, based on the cause indicated in the alert:

- **Errors related to access token validation or user credentials**

  You can resolve some extract refresh problems by clicking the **Connection Details** in the alert. Select the check box next to the problematic data source, click **Actions > Edit Connection**, and then enter the missing information. Click **Save** when you’re done. After you update the connection information, Tableau Server restarts the refresh schedule.

  If you originally embedded the credentials or other data connection information when you published the workbook or data source from Tableau Desktop, you can also republish the workbook or data source. As part of the publishing process, you can choose to set a new refresh schedule. If you don’t choose a new schedule, Tableau Server restarts the existing schedule.

- **Errors that indicate the database was unreachable**

  Confirm that the database is online and that you can sign in to access the data. You can use the **Try again** link in the alert to restart the refresh schedule.

  If the problem cannot be corrected by editing the data connection, you will need to resolve it in Tableau Desktop and republish the workbook.

**Tip:** Administrators can edit data connections at any time on the **Data Connections** page, accessible from each site by clicking the **Content** tab and Data Connections.

**Edit Connections on Tableau Server**

Administrators and data source owners can manage the information that describes how a published data source connects to the underlying data. This information includes the database server name or address, the server port, the database user name, and whether or not the password is embedded in the connection.
**Note:** Ability to edit connections is determined primarily by your site role, rather than by your permissions on the data source. To edit connections, your site role must be Server Administrator, Site Administrator, or Publisher. If your role is Publisher, you also must be the data source owner.

1. Sign in to the site that has the data sources you want to modify, and open the **Data Sources** page.

2. Select the name of the data source with the connection you want to update.

   Use the search box or filters on the left to narrow the data source list. The values you type into the **Server** and **Database username** fields are treated as regular expressions.

3. In the **Connections** view, select the check box for the connection, and then click **Actions > Edit Connection**.

4. Update the connection information.

   For **Server name**, if you want to use an IP address, make sure the database or its driver supports that type of connection. If it doesn’t, enter the database server name.
For connections to Google, Salesforce, and web data connector (WDC) data, see Authentication types for Google, Salesforce, and WDC data later in this topic.

5. Click **Save**.

6. Refresh the browser page for your changes to take effect.

**Authentication types for Google, Salesforce, and WDC data**

Google BigQuery, Google Analytics, Salesforce.com, and many web data connector (WDC) connections use the OAuth authentication standard, which uses secure access tokens instead of “raw” user name and password credentials. With OAuth, database credentials do not need to be stored in Tableau, and all users connect through this access token, including Tableau Desktop users who want to create or edit workbooks that connect to the data source.

The following sections describe Google and Salesforce connection options. Web data connector options vary, but all involve signing in through the provider’s web-based sign-in form to establish the access token.
Google authentication options

When you edit Google BigQuery or Google Analytics connections, select either of the following options in the Edit Connection dialog box:

- Select Embed Google BigQuery (or Google Analytics) credentials in the connection to authenticate through a designated account, and then select an existing account from the list or select authenticate account now... to add a new one.

When you add a new account, the Google sign-in page appears. After you provide your database credentials, Google prompts you to confirm Tableau access to the data. When you click Accept, Google returns an access token to use for connecting to the data.

Note: If you create extracts of your Google data source, select this first option, so that you can schedule refresh tasks.

- Select Prompt user for Google BigQuery/Analytics credentials to require users to connect through their own individual access tokens or sign in each time they connect.

Salesforce.com authentication options

When you edit Salesforce.com connections, you can select any of the following options in the Edit Connection dialog box:

- Select Embed a Salesforce username and password to use a traditional authentication method.

- Select Embed Salesforce credentials in the connection to use an OAuth connection and schedule refresh tasks, and then select an existing account from the list or click Add a Salesforce Account to add a new one.
When you add a new account, the Salesforce.com sign-in page appears. After you provide your database credentials, Salesforce.com prompts you to confirm Tableau access to the data. When you allow Tableau access, Salesforce.com creates an access token through which it connects to the data.

- Select **No Salesforce authentication** to require users to sign in to Salesforce.com each time they connect. (This option does not allow scheduled extract refreshes.)

**Monitor progress**

When you save your changes in the Edit Connection dialog box, the dialog displays the progress. If you close the dialog box, the modifications continue to run in the background until completed. Tableau Server will make as many changes as possible. Any failures will be skipped, but they will not impede other changes. For example, if you try to change the server name and add a password to several connections, the server names will be changed, and
the passwords on workbooks will be changed. However, because you cannot add a pass-
word to a data source, the passwords for the data sources will not be changed.

For information about checking the progress of these tasks, see Background Tasks for
Extracts.

Cube Data Sources

Cube (multidimensional) data sources have certain characteristics that make them unique in
Tableau.

Cube data sources do not support pass-through connections. This means that when a cube
data source is published, you cannot make a connection from Tableau Server using the data
source. It also means you cannot create a workbook using the data source in Tableau
Server.

Publishing a cube data source to Tableau Server gives you the ability to store the data
source on the server. However, to use the data source, you must download the data source
to Tableau Desktop and use it locally. To download a published data source you need:

- The Download/Web Save As permission for the data source. For more information, see Set Permissions on Individual Content Resources.

  - Correct drivers installed and ports opened on computer running Tableau Desktop.

Web Data Connectors in Tableau Server

Web data connectors are web pages that provide a data connection that is accessible over
HTTP for data sources that don't already have a connector in Tableau. Web data con-
nectors allow users to connect to almost any data that is accessible over the web and to cre-
ate extracts for their workbooks. Data sources for a web data connector can include internal
web services, JSON data, REST APIs, and other sources that are available over HTTP or
HTTPS. Users can create their own web data connectors or use connectors that were cre-
ated by others.
For information about how to use a web data connector in Tableau Desktop, see Web Data Connector in the Tableau Desktop documentation.

For information about how to create a web data connector, see the Web Data Connector documentation on Github.

- Before you run connectors on Tableau Server
- Safe list method and import method comparison
- The safe list method
- The import method
- Refresh the extract for a connector
- Troubleshooting

**Before you run connectors on Tableau Server**

As a security measure, Tableau Server won’t run web data connectors unless you approve the connector, as explained in this topic.

**Note**: You must be a server administrator to approve web data connectors for use on Tableau Server.

Web data connectors require your approval because they contain executable code and typically make requests to third-party websites. Before a user can use a web data connector via Tableau Server, you must either add the connectors to a safe list (to a whitelist) or import the connectors into Tableau Server. Before you do this, we recommend that you vet and test the connector so that you know what the connector does and what sites it connects to. For more information, see Testing and Vetting Web Data Connectors.
Safe list method and import method comparison

When you add a connector to the safe list (whitelist), you configure Tableau Server to allow connections to a particular URL where the connector is hosted. This is the recommended way of allowing Tableau Server to run web data connectors. The connectors can then be hosted on a server inside your organization's firewall or on an external domain.

Alternatively, you can import a web data connector. When you import a connector, you run a `tabadmin` command that imports (copies) the connector from a location on your network to all of the machines in your Tableau Server installation.

**Note:** In versions of Tableau Server before 10.0, importing is the only way to run web data connectors on Tableau Server.

Reasons to use a safe list

You might want to add web data connectors to a safe list if:

- Your organization wants to host the connector on a separate server in your network or on an external domain. (That is, on a computer that is not running Tableau Server.)

- Your organization makes updates to connectors frequently. By adding the connector to the safe list, you avoid the need to re-import the connector each time you change it.

- The connector references many files and you do not want to import each file to Tableau Server individually.

Reasons to import web data connectors

As noted, the recommended way to configure Tableau Server to be able to run web data connectors is to use a safe list. However, you might want to import web data connectors if:

- Your organization does not have an existing web server that you can use to host the connector.
Your organization has imported many connectors to Tableau Server in previous versions and wants to manage the connectors in a central location.

By default, both ways of configuring Tableau Server to run connectors are allowed. However, you can restrict the ways that connectors can be added or imported with the `tabadmin set webdataconnector.whitelist.mode` option. For more information, see `tabadmin set options`.

**The safe list method**

To add a web data connector to the safe list, use the `tabadmin whitelist_webdataconnector` command. This command lets you perform the following tasks:

- Add a connector to the safe list.
- List connectors on the safe list.
- Remove a connector from the safe list.
- Configure a secondary safe list, that is, a list of domains that a particular connector can send requests to and receive requests from.

For more information, see `tabadmin whitelist_webdataconnector`.

**The import method**

Use the `import_webdataconnector`, `list_webdataconnectors`, and `delete_webdataconnector` commands to manage imported connectors.

**Import a web data connector**

1. Ensure that you have the HTML file for the web data connector and any supporting files, such as `.css` files or `.js` files.

   The HTML file name for the web data connector can only contain these characters:

   a-zA-Z0-9()~._-
2. On the server, run the import_webdataconnector command, as in this example:

```bash
tabadmin import_webdataconnector connector1.html
```

You can import a web data connector as a local file on the server or from a network share (for example, `\myshare\connector1.html`), as in these examples:

```bash
tabadmin import_webdataconnector c:\web-dataconnectors\connector1.html
```

```bash
tabadmin import_webdataconnector \myshare\webdataconnectors\connector2.html
```

When the command finishes, it displays a URL, as in this example:

```plaintext
===== Importing web data connector to server...
         -- The web data connector with the following URL was imported to the server:
                  http://myserver/webdataconnectors/connector1.html
```

3. Give the URL of the imported web data connector to any users who want to use that connector.

   **Note:** The URL displayed above uses the server’s host name by default. If you have configured a DNS alias for the server, replace the server host name with the DNS alias.

Re-import a web data connector

If you want to re-import a web data connector that’s already been imported (for example, you want to import an updated version of the connector), run the `import_webdataconnector` command with the `overwrite` option, as in this example:

```bash
tabadmin import_webdataconnector \myshare\webdataconnectors\connector1.html --overwrite```
The older version of the connector might still be available in the server’s cache, and users who work with the connector might still see the older version. By default, the maximum lifetime for an item in the cache is eight hours. To force a cache reset, restart the server.

List imported connectors

As the server administrator, you can see a list of web data connectors by running the following command:

```
tabadmin list_webdataconnectors
```

In order to reference a web data connector in a workbook, users need to know the URL for the connector. To get a list of connector URLs, use this command:

```
tabadmin list_webdataconnectors --urls
```

Delete imported connectors

If you no longer need a web data connector, you should delete it from the server. Use the following command to remove an individual web data connector, where `connector_name` is the name of the connector file to delete:

```
tabadmin delete_webdataconnector connector_name
```

(To see a list of web data connectors on the server, use the `tabadmin list_webdataconnectors` command).

To remove all web data connectors from the server, use the following command:

```
tabadmin delete_webdataconnector --all
```

**Note:** When you delete a web data connector, a version of the connector might still be available in the server’s cache, and users might still be able to work with the connector. By default, the maximum lifetime for an item in the cache is eight hours. To force a cache reset, restart the server.
Reference external files from imported connectors

If a web data connector .html file references external files, you must make sure that those files are available on the server. For example, a web data connector might reference an external .css file in a <link> element or a .js file in a <script> element.

If the external files are referenced using a URL (http://), Tableau Server can access the external files as long as the files are on a server that is accessible to Tableau Server.

If the external files are referenced as local files, you can import them into Tableau Server using the `import_webdataconnector` command. For example, if a web data connector that you are importing references the myconnectors.css file, you import the connector and the .css file using this sequence of commands:

```plaintext
tabadmin import_webdataconnector connector1.html

tabadmin import_webdataconnector myconnectors.css
```

An important point is that all files imported using the `import_webdataconnector` command are stored in the same directory on the server—Tableau Server does not let you import external files into a subdirectory. Therefore, you must make sure that any local files referenced in <link> or <script> elements in the connector's .html file do not include paths, only file names.

Imported connectors in a distributed environment

If your server is configured as a cluster, web data connectors are imported to each computer where a gateway process is running. This makes the web data connector available for distributed access across your cluster. Deleting a connector in a distributed environment removes the connector from all the computers where the gateway process is running.

In a distributed environment, the process of importing or deleting a web data connector might complete only partially. If you’re importing a connector, the connector might be copied to some of the computers where the gateway process is running, but not to all of them. In that case, the `tabadmin import_webdataconnector` command reports the error using text like this:
The web data connector with the following URL has been imported to some gateways on the server, but not all.

Similarly, if you're deleting a web data connector, the connector might be removed from some computers but not all of them. The `tabadmin delete_webdataconnector` command reports the error using text like this:

The web data connector was deleted from some gateways on the server, but not all.

**Note:** If the delete process is partially successful, users can still access the connector.

If the import or delete process reports partial success, you can try either of the following solutions:

- Run the import or delete process again. If you’re importing, run the `tabadmin import_webdataconnector` command again, and use the `--overwrite` option to overwrite any instances of the connector that were successfully installed. If you’re deleting, run the `tabadmin delete_webdataconnector` command again. Tableau Server will remove any remaining instances of the connector.

- Stop the server, run `tabadmin configure`, and then restart the server. The configuration process makes sure that any web data connectors are correctly distributed (imported or deleted) in all nodes where the gateway process is running. Since this option requires you to stop the server, you would choose it if it’s practical to stop the server, or if you have some other reason to stop and restart the server.

Performing site import and site export with web data connectors

Web data connectors are imported as server-wide resources; they are not associated with a specific site on your server. Therefore, if you export a site using the `tabadmin exportsite` command, the resulting .zip file does not include web data connectors that might be referenced by workbooks on the site.
Managing imported connectors for failover in a cluster

If your server is configured as a cluster with a backup primary server, you must make sure that web data connectors that you have imported to the primary are available if you need to failover to your backup primary. If the web data connectors are not available on the new primary after a failover, running the configuration process on the primary server can end up removing the connectors from other computers where a gateway process is running.

To make sure that web data connectors are available after a failover, follow these steps:

1. Make sure that you keep an up-to-date backup of the web data connectors that have been imported to your server.

2. After the primary fails, and before you start the backup primary, copy the web data connectors from the backup location to the following folder on the backup primary:

   C:\ProgramData\Tableau\Tableau Server-\data\tabsvc\httpd\htdocs\webdataconnectors

   If you have created a backup of the primary server using the tabadmin backup command, the .tsbak file created by the backup file contains the web data connectors. You can extract the contents of a .tsbak file and get the web data connectors.

   If you installed Tableau Server on a different drive, substitute that drive letter for C:.

3. Overwrite the tabsvc.yml file on the backup primary.

4. Run the tabadmin failoverprimary command. For more information, see Quick Start: Creating a Backup Primary

   If necessary, you can also reimport the web data connectors, as described earlier in this topic.

Refresh the extract for a connector

When a user creates a workbook that uses a web data connector, Tableau creates an extract from the data returned by the connector. If the user then publishes the workbook, the
publish process sends the workbook and the data extract to the server.

Tableau can refresh an extract that was created by a web data connector, the same as it can refresh any extract. Tableau Server cannot invoke a web data connector to refresh an extract if the connector requires credentials to sign in to the web-based data source. This is because the refresh can occur on a schedule or in some other background context, and the server cannot prompt for credentials.

If the background process that performs the refresh operation fails, it creates an alert and a log entry that indicates this issue. (Users will be able to see that the timestamp on the extract does not change.)

If you want, you can disable refresh for all web data connectors, even those that were previously imported. To disable refresh, use the `tabadmin set` command to change the `web-dataconnector.refresh.enabled` setting to `false`, as in the following example:

```
tabadmin set webdataconnector.refresh.enabled false
```

**Troubleshooting**

If the server experiences problems with adding connectors to the safe list or importing connectors, you can examine the `tabadmin.log` files. Be sure to check the log files on both the primary server and on the other servers that are running the gateway process. For more information about log files, see Server Log File Locations.

If the issue is that Tableau Server will not refresh an extract that was created by a web data connector, make sure that the `webdataconnector.refresh.enabled` configuration setting has been set to `true`.

If you have re-imported a changed web data connector on the server (overwriting an existing one), but users who work with the web data connector are not seeing the changes, the users might be getting a cached version of the older version. By default, the cache is reset after eight hours; after a cache reset, older versions of the web data connector will no longer be used. If you want to force the cache to reset, you can restart the server.
If you have deleted an imported connector from the server but users are still able to work with the connector, the connector is probably still in the server’s cache. A web data connector can stay available in the cache for up to eight hours. To clear the cache, restart the server. If you delete a web data connector from a server in a distributed environment, make sure that the connector has been successfully deleted from all computers where a gateway process is running.

Testing and Vetting Web Data Connectors

Web Data Connectors contain JavaScript that typically connects to data on another site. Because of this, you should test and vet web data connectors before users use them as data sources for a workbook, and before you import them into Tableau Server.

This topic includes some suggestions for testing and vetting web data connectors.

- Examine the source

- Test the web data connector in an isolated environment

- Monitor the traffic created by the connector

- Test the performance and resource usage of the connector

Examine the source

The code in a web data connector is in JavaScript, so you can open the file (and any external files that the connector uses) and examine the source code.

Many connectors reference external JavaScript libraries, such as the jQuery library or API libraries for third parties. Validate that the URL for external libraries points to a trusted location for the library. For example, if the connector references the jQuery library, make sure that the library is on a site that is considered standard and safe. If it is practical for you to change the source code of the connector, use HTTPS protocol (https://) to reference external libraries (if the source site supports HTTPS) to help verify the site’s authenticity.
To the extent possible, make sure you understand what the code is doing. In particular, try to understand how the code is constructing requests to external sites, and what information is being sent in the request.

**Note:** Experienced JavaScript programmers often compress (minify) their code to reduce the size of the code for download. Dense blocks of code that use cryptic function and variable names are not uncommon. While this can make it more difficult to examine the code, it is not a sign that the code was written to be deliberately difficult to understand.

**Test the web data connector in an isolated environment**

If possible, test the web data connector in an environment that is isolated from your production environment and from user computers. For example, import a web data connector onto a test computer or virtual machine that’s running a version of Tableau Server that is not used for production.

**Monitor the traffic created by the web data connector**

When you test a web data connector, use a tool like Fiddler, Charles HTTP proxy, or Wireshark to examine the requests and responses that the connector makes. Make sure that you understand what sites the connector makes requests to and what content the connector is requesting. Similarly, examine the responses and their content to be sure that the connector is not reading data or code that is not directly related to the connector’s purpose.

**Test the performance and resource usage of the web data connector**

When you test a web data connector, use tools to monitor its CPU and memory usage. Remember that the web data connector will run on Tableau Server, which is an environment in which many processes are already running. You want to make sure that when the connector fetches data, the connector does not have an undue impact on server performance.
Check whether the connector writes to disk. If it does, check how much disk space it occupies, and examine the output to make sure you understand what it's writing and why.
Server Administrator Overview

Tableau Server integrates with a number of components in your IT infrastructure to provide a unique self-service data analytics culture for your users. It’s important that you, as a server administrator, understand how Tableau Server fits into your IT infrastructure.

The topics in this section provide information on planning, deploying, tuning, and managing Tableau Server.

If you are new to Tableau Server, and you want to deploy it in your organization, we encourage you to deploy Tableau Server as a single server in a test environment first. The easiest way to do a single-server installation and to understand the essential requirements is to follow the steps in Everybody’s Install Guide.

This topic provides a brief overview of how to think about Tableau Server and how it interacts with your existing IT infrastructure.

Architectural overview

Tableau Server is a collection of processes that work together to provide a full self-service analytic platform for your users. The following diagram shows a high-level architectural view of Tableau Server.
Multiple server **processes** (shown in blue above) work together to provide services at various tiers. The Gateway process is the component that redirects traffic from all Tableau clients to the available server nodes in a cluster.

Data Services is a logical grouping of services that provide data freshness, shared metadata management, governed data sources, and in-memory data. The underlying processes that power Data Services are the Backgrounder, Data Server and Data Engine processes.

Analytics Services, composed of the VizQL and Cache Server processes, provide user-facing visualization and analytics services and caching services.

Sharing and Collaboration, and Content Management Service are powered by the Application Server process. Core Tableau Server functionality such as user login, content management (projects, sites, permissioning, etc.) and administration activities are provided by the Application Server process.

All of the above services use and rely on the Repository process, which contains structured relational data like metadata, permissions, workbooks, data extracts, user info, and other data. The File Store process enables data extract file redundancy across the cluster and ensures extracts are locally available on all cluster nodes. Under heavier loads, extract files are available locally across the cluster for faster processing and rendering.
Tableau's architecture is flexible, allowing you to run the platform just about anywhere. You can install Tableau Server on-premises, in your private cloud or data center, on Amazon EC2, on Google Cloud Platform, or on MS Azure. Tableau analytics platform can also run atop virtualization platforms. We recommend you follow the best practices for each virtualization platform to ensure the best performance from Tableau Server.

Tableau and your data

When you install Tableau Server into your organization, it becomes a core component of the analytics pipeline to the data your users need. It's important to understand how Tableau Server interacts with your business data. Specifically, Tableau Server can store extracts of data in your organization. It can also connect to live data sources. How you choose to provide the data to your Tableau users is informed by a number of variables: data source type, user scenario, performance and access requirements, and infrastructure conditions.

Tableau Server has not been architected as a data warehouse server where static, native data files are housed. In fact, using Tableau Server as a traditional data warehouse is a poor use of your investment. Rather, when it comes to data storage, we recommend hosting optimized data extracts on Tableau Server. While a data extract is often a subset of a larger data source in your organization, you can also create extracts for data sources that are overtaxed during work hours by scheduling the extract refresh for off-hours.

Extracts are also useful for modeling data or to enable highly-performant visualization authoring. For example, to improve visualization authoring and interaction performance you may optimize extracts by filtering the source data to the essential fields for a given department or project. Extracts can be resource intensive. If your organization plans to make heavy use of extracts, review the topic, Optimize for Extracts.

Tableau Server also provides direct, authorized access to live data sources, allowing users to build and run complex filtered queries against a variety of connected data sources. For this scenario, Tableau requires highly performant network access to the data sources in your organization and to those in the cloud. Tableau Server and the target data sources also need to be properly sized to handle the processing load required by high-volume, complex...
data operations. You can optimize performance for live data connections with caching configurations and specifying initial SQL commands.

User access

Tableau Server is also a web-based collaboration platform, where users connect to share, view, and interact with data visualizations and data sources from a variety of devices. This means that Tableau Server must be accessible to Tableau users within your local protected network. You can also extend access to data visualizations to desktop, mobile, and authenticated web users outside your organization.

Tableau Server integrates with the following user authentication solutions: Active Directory, SAML, OpenId, and Kerberos.

Where should I install Tableau Server in my network?

Because of the highly-sensitive nature of most data that organizations manage with Tableau Server, and because Tableau Server requires access to internal data stores, Tableau Server must be run inside a protected network. Authenticated access from the internet is configured to connect to Tableau Server through a reverse proxy or a VPN solution.
Some organizations embed Tableau views in public webpages, or, for internal users, on generic web servers on the internal network.

Tableau Server can be configured to support such scenarios with either authenticated or anonymous access. For authorized access, where users can only view underlying data to which they have permission, you can configure trusted tickets with a generic web server. In this scenario, Tableau Server authorizes access to the underlying data in an embedded view. This scheme enables you to host interactive data visualizations on a web server in a DMZ or outside the protected network.

Anonymous access to embedded Tableau views requires that you enable "guest user" for Tableau Server. Guest user also requires that you license Tableau Server according to the number of cores you are running, rather than a named-user (interactor) model.

**Sizing and scalability**

Depending on the size and data usage in your organization, you can scale Tableau Server up or out. As you scale your server, you can also selectively allocate resources to meet your data needs and user needs.

When you scale up Tableau Server, you add hardware resources to a single server. For example, you might increase the memory and processing power of the computer running Tableau Server.

When you scale out Tableau Server, you add computers (or nodes). To create a highly available deployment with failover, you need at least three nodes. For example, you might run most CPU-intensive server processes on two nodes and use the third node for the gateway and coordination controller services.

Whether you scale up or scale out, you can selectively allocate resources by configuring the number and type of server processes that run. If your organization has a lot of data and creates a lot of data extracts, you can increase the number of processes that are dedicated to refreshing and storing extracts. Alternatively, if your organization wants to optimize for heavy user loads, you can increase the number of processes dedicated to responding to user
requests. Additionally, you can integrate Tableau Server into industry-standard network load balancers to further optimize your server for user requests.

Tableau Server management model

Tableau Server has been designed to support a management scheme with two high-level administrators: server administrator and site administrator. In small organizations, these roles may be assumed by the same person or team, but in larger organizations, the roles often diverge.

In this model, server administrators are IT professionals who maintain and deploy heterogeneous server solutions. Essential areas for server administrators may include networking, hardware tuning and maintenance, security and access, and managing users and directory services. The tools and documentation that we deliver with Tableau Server for the server administrator support these core server IT areas.

Site administrator, on the other hand, is an administrative role specific to Tableau Server or Tableau Online deployments. The Tableau site administrator is fundamentally concerned with data content. The site administrator manages users and their access to projects, workbooks, and data sources. To learn about sites and how to plan your deployment for them, see What is a Site?

Management tools

Tableau Server includes a number of toolsets for managing the system:

- **Tableau Server administrator page**: This is the web-based administrative site that is installed on each Tableau Server instance. Tasks performed on the administrator page are day-to-day tasks for both server and site administrators. Server-related tasks include creating sites and site administrator accounts, optionally importing users, setting up synchronization with directory services, setting up extract refresh schedules, monitoring server performance and usage, and other global settings.
Site-related tasks include managing content and assign permissions, running extract refreshes, create groups and projects, monitoring site activity, optionally adding users, and other content-related tasks.

Permissions required for the Tableau Server administrator page are role based. The roles are generated and managed by Tableau Server.

- **Tableau Server Configuration Utility**: This is the primary utility for server-wide configurations. The configurations made with this utility are rarely revisited after initial configuration. For example: SSL, subscriptions, data caching, service account, SMTP alerting, user authentication, and single-sign on configuration are all performed with the utility. You must use an account with local server administrator permissions to run the Tableau Server Configuration Utility.
- **tabadmin**: This is a command line tool that allows you to configure multiple components of Tableau Server. tabadmin installs with Tableau Server by default.
- **tabcmd**: You can use the tabcmd command-line utility on a Windows computer to create scripts to automate administrative tasks on your Tableau Server site. For example, use tabcmd for creating or deleting users, projects, and groups.
- **REST API**: With the Tableau Server REST API you can manage and change Tableau Server resources programmatically, via HTTP. The API gives you simple access to the functionality behind the data sources, projects, workbooks, site users, and sites on a Tableau server. You can use this access to create your own custom applications or to script interactions with Tableau Server resources.

**Security**

As an application server connecting to data that may be highly-sensitive, Tableau Server supports and implements a number of industry security standards. Our server admin documentation includes best practices and implementation for user authentication, authorization, data security, and network security. While our default installation is secure by design, we also recommend following the security hardening checklist to further lock down your deployment.

For more information about security audit compliance, vulnerability reporting, and other security resources, visit http://www.tableau.com/security.
Plan Your Deployment
Before you install...

**Note:** You can find additional information about technical specifications for Tableau Server on the Tableau website, [here](#).

This topic includes requirements and recommendations that you must consider before you install Tableau Server into a production environment. If you want to install a single server, or if you want to do a minimal installation for test purposes, refer to our single-server installation guide, *Everybody’s Install Guide*.

If you are deploying Tableau Server in a distributed cluster, review Distributed Requirements in addition to the requirements and recommendations described in this topic.

**Requirements**

In addition to the following requirements, you can find technical specifications for Tableau Server on the Tableau website.


- **Supported browsers**—Tableau Server 10 supports Internet Explorer 11 in native mode, and the latest versions of Chrome, Firefox, and Safari.

This has potential to impact:

- Customers installing Tableau Server for the first time on Windows 8 or Windows Server 2012 (non-R2). For more information, see [Internet Explorer](#).
Support.

- Customers accessing embedded Tableau views in web pages that force Internet Explorer into compatibility mode. For more information, see Internet Explorer Compatibility Mode.

 Minimum requirements—The computer you install Tableau Server on must meet or exceed the minimum hardware requirements. Tableau Server will not install if your computer does not meet the minimum requirements.

  - Minimum requirements are appropriate for testing and prototyping.
  - For production environments your computers should meet or exceed the minimum recommendations.

For more information, see Minimum Hardware Requirements and Recommendations for Tableau Server.

 Administrative account—The account under which you install Tableau Server must have permission to install software and services.

 Static IP addresses—Any computer running Tableau Server, whether it’s a single server installation or part of a cluster, must have a static IP address. For more information, see Update Configuration for a New IP Address.

Optional and recommended considerations

The following technical specifications may not apply to all scenarios.

 Optional: Run As User account—A Run As User account for the Tableau Server service to run under is useful if you’re using NT Authentication with data sources or if you’re planning on doing SQL Server impersonation. For more information, see Run As User and SQL Server Impersonation.

In some organizations, Group Policy or other system management solutions are used to standardize permissions and accounts on application servers. If your organization
runs a such a solution, be sure to configure the system to accommodate the folder permissions required by the Run As User account. See Verify Folder Permissions.

- **IIS and port 80**—Our recommendation is to run Tableau Server on a dedicated computer. Running Tableau Server on a computer with other applications may degrade performance. In addition, running Tableau Server with other applications may interfere with ports required by Tableau Server. Tableau Server’s gateway listens on port 80, which is also used by Internet Information Services (IIS) by default. If are installing Tableau Server on a computer that’s also running IIS, you should modify the Tableau’s gateway port number to avoid conflict with IIS. See Tableau Server Ports and Edit the Default Ports for details.

- **Antivirus software**—Antivirus software that performs full drive scans can interfere with Tableau Server. In some cases, interference from antivirus software will prohibit Tableau Server from starting up. In addition, full scans of active drives where Tableau Server is installed may impact performance. If you plan to run antivirus software on the computer running Tableau Server, follow the recommendations in the Knowledge Base.

### Ports and networking

By default Tableau Server requires several TCP/IP ports to be available to the server. See the topic Tableau Server Ports for the full list, including which ports must be available for all installations vs. distributed installations or failover-ready installations. The default ports can be changed if there is a conflict. See Edit the Default Ports to learn how.

Tableau Server was designed to operate inside a protected internal network. Do not set up Tableau Server directly on the internet or in a DMZ. To provide internet access to Tableau Server we recommend configuring a proxy server. See Configuring Proxies for Tableau Server.
Installation directory

By default, Tableau Server will install on the system drive. The drive where Windows is installed is the system drive. In most cases, the system drive is the C:\ drive. In this default case, Tableau Server will install into the following directories:

- C:\Program Files\Tableau\Tableau Server
- C:\ProgramData\Tableau\Tableau Server

Non-default installation locations

Rather than install onto the system drive, some organization install applications on a separate drive. During setup (or with automated installation), you can specify a different installation location. If you select a different installation drive or folder location during setup, then the data directory for Tableau Server will install into the same path. This means that if you install to a non-default location, then the \ProgramData\Tableau\Tableau Server path will not be created.

For example, installing Tableau Server to the root of a non-system drive (e.g., D:\), results in a single install path: D:\Tableau\Tableau Server.

When you install to a non-default location, you must take the following into consideration:

- You may need to configure Run As User permissions manually. If you do not use the predefined local account, NetworkServices, as the Run As User account, then you will need to set permissions for the account that you will be using. You must set these permissions after you install Tableau Server. See Verify Folder Permissions.

- Log files are stored at <installation path or drive>\Tableau\Tableau Server\logs.

- C:\ProgramData\Tableau\Tableau Server\data path in default installation is converted to <installation path or drive>\Tableau\Tableau Server\data.
• You will need to specify the same location when you upgrade to newer versions of Tableau Sever. See Upgrade Tableau Server to a Non-Default Location.

Drivers

You may need to install additional database drivers. Download drivers from www.tableau.com/support/drivers.

Configuration Information

When you install and configure Tableau Server you may be asked for the following information:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Your Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run As User (service account)</td>
<td>The server must have a user account that the service can use. The default is the built-in Windows Network Service account. If you use a specific user account you’ll need the domain name, user name, and password.</td>
<td>Username:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Password:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Domain:</td>
</tr>
<tr>
<td>Active Directory</td>
<td>Instead of using Tableau’s built-in user management system, you can authenticate through Active Directory. In this scenario, Tableau Server must be installed in a domain in Active Directory. You’ll need the fully-qualified domain name for the domain where user accounts are managed.</td>
<td>Active Directory Domain:</td>
</tr>
<tr>
<td>Open port in Windows firewall</td>
<td>When selected Tableau Server will open the port used for http requests in the Windows Firewall software to allow other machines on your network to access the server.</td>
<td>__ - Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>__ - No</td>
</tr>
</tbody>
</table>
What's New and What's Changed

Find out about the new and changed features in Tableau Server:

- See the What's New in Tableau Server topic in the Tableau Server online help for information about key new features.
- See What's Changed - Things to Know Before You Upgrade for information about changes that may impact your users.

Minimum Hardware Requirements and Recommendations for Tableau Server

The following minimum hardware requirements and recommendations apply to all computers running Tableau Server, including physical hardware and virtual machines (VMs):

- **Minimum requirements** are the minimum hardware your computer must have in order to install Tableau Server. If your computer does not meet these requirements, the Setup program will not install Tableau Server. These requirements are appropriate for testing and prototyping.

- **Minimum recommendations** are higher than minimum requirements, and represent the minimum hardware configuration you should use for a production installation of Tableau Server. If your computer meets the minimum requirements but does not meet these recommendations, the setup program will warn you but you can continue the installation.

In addition, Tableau Server should not be installed on a physical computer or on a VM instance that is also running resource-intensive applications such as databases or application servers.

**Note:** If you install Tableau Server on a computer that meets the minimum requirements but does not have at least 8 cores and 16 GB of system memory, the default num-
ber of all processes installed is reduced to one of each process by design. For more information about processes, see Server Process Limits

Minimum Hardware Requirements

The computer on which you are installing or upgrading Tableau Server must meet the minimum hardware requirements. If the setup program determines that your computer does not meet the following requirements, you will not be able to install Tableau Server. For more information on how the Setup program determines hardware, see "Determining Computer Hardware," below.

These minimum requirements are appropriate for a computer that you use for prototyping and testing of Tableau Server. They apply to single-node installations and to each computer in a distributed installation.

<table>
<thead>
<tr>
<th>Minimum Hardware Requirements</th>
<th>CPU</th>
<th>RAM</th>
<th>Free Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-core</td>
<td>8 GB</td>
<td>15 GB</td>
</tr>
</tbody>
</table>

For the requirements:

- Free disk space is calculated after the Tableau Server Setup program is unzipped. The setup program uses about 1 GB of space.

- Core count is based on "physical" cores. Physical cores can represent actual server hardware or cores on a virtual machine (VM). Hyper-threading is ignored for the purposes of counting cores.
**Note:** For Tableau Server 10.2, you need a minimum of 2 physical cores. If you are installing on an Amazon EC2 instance, this means 4 vCPUs. For more information, see Amazon EC2 Instances.

Minimum Hardware Recommendations

For production use, the computer on which you install or upgrade Tableau Server should meet or exceed the minimum hardware recommendations. These recommendations are general. Actual system needs for Tableau Server installations can vary based on many factors, including number of users and the number and size of extracts. If the setup program determines that your computer does not meet the following recommendations, you will get a warning, but you can continue with the setup process.

<table>
<thead>
<tr>
<th><strong>Install Type</strong></th>
<th><strong>Processor</strong></th>
<th><strong>CPU</strong></th>
<th><strong>RAM</strong></th>
<th><strong>Free Disk Space</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single node</td>
<td>64-bit</td>
<td>8-core, 2.0 GHz</td>
<td>32 GB</td>
<td>50 GB</td>
</tr>
<tr>
<td>Multi-node and enterprise deployments</td>
<td>Contact Tableau for technical guidance.</td>
<td>Nodes must meet or exceed the minimum hardware recommendations, except nodes running backgrounder, where 4 cores may be acceptable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determining Computer Hardware

To determine how many physical cores a computer has, the Tableau Server setup program queries the operating system. To view hardware information that the setup program detected on your computer, open the **tabadmin.log** file in the following folder on the computer where you are installing Tableau Server:

```
<install directory>\ProgramData\Tableau\Tableau Server-\logs\tabadmin.log
```
In the tabadmin.log file, look for lines similar to the following. These lines provide information about the physical and logical cores that the setup program detected and that it used to determine the core count that is being used for licensing.

2015-04-09 14:22:29.533 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Running hardware check

2015-04-09 14:22:29.713 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Detected 12 cores and 34281857024 bytes of memory

2015-04-09 14:22:29.716 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Hardware meets recommended specifications. Default values will be used.

Manually determining the number of cores on your computer

To determine manually how many physical cores your server has, you can use the Windows Management Instrumentation Command-line tool (WMIC). This is useful if you do not know whether your computer will meet the minimum hardware requirements for installing Tableau Server.

1. Open a command prompt.

2. Enter the following command:

   WMIC CPU Get DeviceID,NumberOfCores

   The output will display the device ID or IDs and the number of physical cores the computer has.
In this example, there are two CPUs, each with six cores, for a total of twelve physical cores. This computer would satisfy the minimum hardware requirements for installing Tableau Server.

The following command shows a longer version that lists the logical processors as well as the physical cores.

```
WMIC CPU Get DeviceID,NumberOfCores,NumberOfLogicalProcessors
```

In the above example, the server has a total of twelve physical cores, resulting in 24 logical cores.

**Domain Trust Requirements**

When you run Tableau Server in an Active Directory environment across multiple domains (either in the same Active Directory forest or in different forests), some Tableau functionality is dependent on the trust relationship between the domains. For example, some administrators manage users in domains that are separate from where they deploy server applications, such as Tableau Server. In other organizations, a Tableau Server deployment might
be shared with external partners or with different partners in the organization. Finally, Windows-authenticated data sources, such as SQL Server, MSAS, or Oracle, that Tableau Server connects to may also be in other domains.

If it’s feasible, we recommend configuring two-way trust between all domains that interact with Tableau Server. If this is not possible, Tableau Server can be configured to support user authentication where a one-way trust has been configured. In this case, a one-way trust between domains is supported when the domain in which Tableau Server is installed is configured to trust the domain where user accounts reside.

The following illustration shows one-way trust between the domain where Tableau Server is installed and the domain where user accounts reside:

![Diagram showing one-way trust between domains](image)

In this scenario, Tableau Server is in the dev.local domain, and users from the users.lan Active Directory domain are imported into Tableau Server. A one-way trust is required for this scenario; specifically, the dev.local domain is configured to trust the users.lan domain. Users in the users.lan domain can access Tableau Server in the dev.local with their normal Active Directory credentials. However, you may need to update the domain nickname on Tableau Server before users log on with the nickname. Refer to the Tableau Knowledge Base for more information.
When you configure Tableau Server for this scenario, specify the user domain in the Tableau Server Configuration utility.

Kerberos single sign-on is supported in this one-way trust scenario.

Review User Management in Active Directory Deployments to understand how multiple domains, domain naming, NetBIOS, and Active Directory user name format influence Tableau user management.

Connecting to live data in one-way trust scenarios

In the one-way trust scenario, users connecting to Tableau Server can connect to live data that’s hosted in the cloud or on any other data source on premises that does not rely on Windows authentication.

Data sources that require Windows-authentication might have additional authentication requirements that complicate the scenario, or that can even prevent Tableau Server users from connecting. This is because Tableau Server uses the Run As User account for authentication with such data sources. If you are running Tableau Server in a different domain than data sources that use Windows authentication, verify that the Run As User account that is used for Tableau Server can access the data source.
Run As User

The *Run As User* is a Windows account that Tableau Server uses ("runs as") when it access resources. For example, Tableau Server reads and writes files on the computer where Tableau Server is installed. From the perspective of Windows, Tableau Server is doing this as the Run As User. In some cases, Tableau Server may use the Run As User account to access data from external sources, such as databases or files on a shared network directory.

As you plan your Tableau Server deployment, you need to determine if the default Run As User, configured to run under the context of the local Network Service account (NT Authority\Network Service), will suffice for your needs. If it does not, then you will need to update the Run As User to run under a domain account that has access to the resources in your Active Directory domain(s).

In either case, it’s important to understand the security implications of the account that Tableau Server uses for the Run As User. Specifically, if Tableau Server needs to access other servers, file shares, or databases that use Windows authentication, then the account that is configured for Run As User will be used to access those resources. The account that is configured for Run As User must also have elevated permissions to the local Tableau Server. A general best security practice is to limit the scope of all user accounts to the minimum required permissions. We make the same recommendation to you as you plan Run As User.

You set or update the Run As User account in the Tableau Server Configuration utility. The utility sets permissions for the Run As User, but if you are unsure if the account you want to use for Run As User satisfies the requirements, or if you have changed the Run As User and are getting permission errors, see Required Run As User Account Settings.
Default Run As User account: Network Service

The Network Service account is a predefined local account with limited permissions that exists on all Windows computers. While it has limited administrative access to the local computer on which it runs, it does have more access to resources than members of the Active Directory default Users group. For example the Network Service group can write to the registry, the event log, and has special rights to log on for application services.

By default, the Run As User is set to a local account called Network Service. Use the default Network Service account when:

- You are using local authentication for Tableau Server.
- All users in your organization include extracted data in the workbooks that they are uploading to Tableau Server.
- You are running Tableau Server in a single-server deployment.
- External data sources that your users access through Tableau Server do not require Windows NT integrated security or Kerberos. In most data-access scenarios, Microsoft SQL Server, MSAS, Teradata, and Oracle databases require Windows NT integrated security.

While the Network Service account can be used to access resources on remote computers within the same Active Directory domain we do not recommend using the default account for such scenarios. Instead, configure a domain account for Run As User if Tableau Server must connect to data sources in your environment. See Create and Update the Run As User Account.
Run As User account: Domain user

For all Active Directory scenarios, we recommend updating the Tableau Server Run As User with a domain user account. Update the Run As User to a domain user account when data sources accessed through Tableau Server require Windows NT integrated security or Kerberos.

If you have deployed a distributed deployment of Tableau Server, then you can update the Run As User account with either a domain user or a Windows workgroup user. In either case, you must use the same user account for all server nodes. See Distributed Requirements for more information.

To configure your environment to use a domain account, see Create and Update the Run As User Account.

Configure Data Source Connection Settings

To automatically authenticate your users when the workbook they’re accessing connects to a live, NT-authenticated data source, configure your Tableau data connection with the **Use Windows NT Integrated security** option selected:

**Windows NT Integrated Security**

Authenticates with the server’s Run As User account

**Username and Password**

Each Tableau Server user is prompted for database credentials
Create and Update the Run As User Account

If you are operating in an environment where a majority of your data sources are authenticated in the context of Active Directory (Windows NT integrated security) then you will need to configure the Run As User to use a domain account, not the local account (NetworkService) that’s the default.

There are two steps:

1. Create the Run As User account in Active Directory
2. Update Tableau Server to use the Run As User account

Creating the Run As User account

Follow these best practices:

- Create a dedicated account in Active Directory for the Tableau Server Run As user account. In other words, don’t use an existing account. By using a dedicated account you can be sure that the data resources that you permission for Tableau Server are only accessible by Tableau Server Run As User.
- Do not use an account with any kind of domain administrative permissions. Specifically, when you create an account in Active Directory, create an account in the domain User Group. Do not add the account that you create to any Active Directory security groups that needlessly elevate the permissions for the account.
- Permission the data sources in your directory for this one account. The account that you’ll use for Run As User only needs Read access to the appropriate data sources and network shares.
- If users in your organization authenticate with smart cards, disable the smart card logon option for the Run As User account.

Updating the Run As User account in Tableau Server

After you have created the Run As User account in Active Directory, configure Tableau Server to use that account as the Run As User. See Configure General Server Options for information on how to update the Run As User account. After you update the Run As User, Tableau Server (tabconfig) will automatically configure permissions on the local computer for the Run As User account that you have entered.
If you have changed the Run As User account, then we recommend revoking the permissions for the previous account. See Revoke Run As User Account Permissions.

If you have installed Tableau Server on a drive other than the system drive, then you will need to configure the system drive to allow the Run As User additional permissions. The system drive is the drive where Windows is installed. For example, if you have installed Windows on the C:/ drive, then C:/ is your system drive. If you install Tableau Server on any other drive (D:/, E:/, etc), then you will need to configure permissions for the Run As User account on the system drive. See Required Run As User Account Settings for more information.

Reapplying Permissions

To reapply permissions to your Run As User account, you must first reset permissions by applying them to the default NetworkService account. This procedure requires you to restart Tableau Server services twice, so run this procedure during off hours.

1. Open the Tableau Configuration Utility and click the General tab.

2. In Server Run As User section, enter NT AUTHORITY\NetworkService in the User field. The NetworkService account is a predefined Windows account that is used as the default account when Tableau Server is installed. This account does not require a password.

3. Click OK to reset permissions to the NetworkService account. This operation typically takes about 5 minutes, but may take longer. When finished, a tabconfig notification will be displayed: Settings have been saved. Changes will take effect when Tableau Server next starts. Click OK.

4. Use tabadmin or the Tableau Server utilities to restart the server.

5. After Tableau Server services start up again, follow the previous four steps, using the original Run As User account in Step 2.
Related tasks

The Run As User is central to many operations on Tableau Server, especially those that are involved with remote data access. To avoid access errors, review the tasks here and follow the links for those that apply to your scenario.

- If you are running Tableau Server in an organization with multiple Active Directory domains, see Domain Trust Requirements.
- Enabling Kerberos single sign-on requires additional configuration related to the Run As User. To enable Kerberos single sign-on with Tableau Server, see Kerberos.
- Enabling impersonation requires additional configuration related to Run As User. To deploy and enable impersonation with Microsoft SQL Server, see Impersonate with Embedded SQL Credentials.
- If you have installed Tableau Server onto the non-system drive, then you will need to manually set some permissions for the Run As User. See Required Run As User Account Settings for more information.
- If you have changed the Run As User account, then we recommend revoking the permissions for the previous account. See Revoke Run As User Account Permissions.
- If your organization uses a forward proxy solution, then you may need to reconfigure the local LAN settings on the Tableau Server with the Run As User account. See Configure a forward proxy server for more information.

Troubleshoot Run As User

As discussed in the topic, Run As User, Tableau Server requires administrative-like access to the machine on which it is installed. Therefore, when you update the Run As User in Tableau Server Configuration, a background process will configure permissions on the Tableau computer for that account. However, in some complex deployment scenarios you may need to verify or manually configure the Run As User permissions on the local Tableau Server computer. Use this section to verify how permissions are configured on the machines running Tableau Server in your deployment. This section also includes procedures that describe how to set permissions and configure security policies for the Run As User.
Required Run As User Account Settings

The Run As User account needs permissions that allows it to modify files and registry settings. In addition, because the Run As User is used as the security context for the Tableau Server Application Manager service (tabsvc), the account must also be given rights to log on as a service.

These permissions are set automatically when you update the Run As User account in Tableau Server Configuration as described in the topic, Create and Update the Run As User Account.

If you have changed the Run As User account, then we recommend revoking the permissions for the previous account. See Revoke Run As User Account Permissions.

If you have recently changed Run As User or are getting permission errors, use this section to confirm that Tableau Server meets the permission requirements that are detailed here. If you’re running a distributed installation, all Run As User permission configurations must be the same across the primary server and all worker nodes.

**Note:** Do not hide the files created by the Tableau Server installer.

Verify Folder Permissions

The account the Tableau Server service runs under is referred to as the Run As User account. The Run As User account needs permission to specific folder resources on the Windows computer.

This topic provides:

- An accounting of the permissions that are required by the Run As User
- Information about installing Tableau Server in non-default locations.
- How to reapply permissions on an existing Run As User account using the Tableau Configuration Utility
This topic refers to the drive where Windows is installed as the *system drive*. The system drive is equivalent to the Windows environmental variable, `%WINDIR%`. The drive where Tableau Server is installed is referred to as the *install drive*.

<table>
<thead>
<tr>
<th>Resource</th>
<th>System or install drive</th>
<th>File Path</th>
<th>Permissions required</th>
</tr>
</thead>
<tbody>
<tr>
<td>folder</td>
<td>system</td>
<td><code>SYSTEMROOT:\windows\system32</code></td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>executable</td>
<td>system</td>
<td><code>SYSTEMROOT:\windows\system32\cmd.exe</code></td>
<td>Read &amp; execute, List folder contents</td>
</tr>
<tr>
<td>Drive root</td>
<td>install</td>
<td><code>root, for example,Local Disk (C:)</code></td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>folder</td>
<td>install</td>
<td><code>PROGRAMFILES\Tableau\Tableau Server</code></td>
<td>Modify</td>
</tr>
<tr>
<td>folder</td>
<td>install (on system drive)</td>
<td><code>\ProgramData\Tableau\Tableau Server\</code></td>
<td>Modify</td>
</tr>
<tr>
<td>folder</td>
<td>install (on non-system drive)</td>
<td><code>\Tableau\Tableau Server\data\</code></td>
<td>Modify</td>
</tr>
</tbody>
</table>
When you update the Run As User account in the Tableau Server Configuration utility, a background process (tabconfig) will configure the folder permissions on the Tableau computer for the Run As User account that you specify.

In this case, where you are installing on the system drive into the default folder (C:\Program Files\Tableau), the configuration of folder permissions will be handled by the tabconfig process when you update the Run As User account in Tableau Server Configuration. You do not need to verify or change any folder permissions for this scenario. If you install Tableau Server onto a different drive, you will need to manually configure some permissions.

### Installing on non-system drive or in a different folder

If you have installed Tableau Server on a drive other than the system drive, then you will need to configure the system drive to allow the Run As User additional permissions. If you install Tableau Server on a drive other than the system drive, then you will need to configure additional permissions. The following table describes the additional permissions that you need to configure if you install Tableau Server on a drive other than the system drive.

<table>
<thead>
<tr>
<th>Resource</th>
<th>System or install drive</th>
<th>File Path</th>
<th>Permissions required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive root</td>
<td>install</td>
<td>root, for example, D:\</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>folder</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>executable</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32\cmd.exe</td>
<td>Read &amp; execute, List</td>
</tr>
</tbody>
</table>
This procedure describes how to set permissions for the Run As User on a given folder in Windows. Use this procedure to set the permissions specified in the table above. This procedure shows how to modify permissions where the Windows system drive is the C:\ drive and the Tableau install drive is on D:\.

1. On the computer hosting Tableau Server (and on Tableau Worker nodes, if distributed), use Windows Explorer to right-click the Tableau Server install drive, for example **Local Disk (D:)**, and select **Properties**.

2. In the Local Disk Properties Window, select the **Security** tab.

3. Click **Edit**, then **Add**.

4. In the Select Users, Computers, Service Accounts, or Groups dialog box, type the `<domain>\<username>` for the Tableau Server Run As User account.

5. Click **Check Names** to resolve the account, then **OK** to confirm.

6. With the Tableau Server Run As User account highlighted, select **List folder contents** and **Read**.

7. On the bottom of the **Security** tab, click **Advanced**.

8. In the Advanced Security Settings for Local Disk (C:) window, click **Change Permissions**.

9. In the Advanced Security Settings for Tableau dialog box, highlight the Run As User account and select the **Replace all child object permissions with inheritable permissions from this object** check box.

10. Click **OK** to apply changes to all subfolders and files - this may take a few minutes.
Note: You may encounter one or more warning messages from Windows when you apply these changes. For example, a Windows Security warning message will appear that warns that changing permissions on the root directory may reduce security of the computer. In all cases, verify that the warnings are acceptable given the context and continue with the procedure.

11. Click **OK** to confirm changes, then click **OK** in the Local Disk (C:) Properties dialog box.

12. Follow the steps above to apply the following permissions:
   - **Read, List folder contents:** `SYSTEMROOT:\windows\system32`
   - **Read & execute, List folder contents:** `SYSTEMROOT:\windows\system32\cmd.exe`

13. Click **OK** to exit.

Note: In some cases, Windows will display a Recycle Bin error: “The Recycle Bin is corrupted. Do you want to empty the Recycle Bin for this drive?” Click **Yes**.

Reapplying folder permissions

In some organizations, Group Policy or other system management solutions are used to standardize permissions and accounts on application servers. If your organization runs a such a solution, be sure to configure the system to accommodate the folder permissions required by the Run As User account. If the folder permissions for the Run As User account have been changed, you can use Tableau Configuration Utility to reapply the permissions. See Reapplying Permissions.
Verify Registry Permissions

The account the Tableau Server service runs under needs permission to modify the registry on the local machine.

When you update the Run As User in Tableau Server Configuration, a background process (tabconfig) will configure the registry permissions on the Tableau computer for the account you specify. It’s unlikely that you will need to apply these permissions manually.

Verify that the Run As User has been granted permissions to the following registry branches. If account that you have specified as the Run As User is a member of the local administrative group or a member of the Domain Admins security group, then the account will not be displayed on the Permissions page.

- HKEY_CURRENT_USER\Software\Tableau
- HKEY_LOCAL_MACHINE\Software\Tableau

Permissions

Tabconfig will grant Read permission and the following Special permissions to these branches:

- Query Value
- Set Value
- Create Subkey
- Enumerate Subkeys
- Notify
- Write DAC
- Write Owner
- Read Control

To view or edit permissions on registry directories:

1. Open the Registry Editor by entering regedit in Windows Run, and then clicking OK.
2. In Registry Editor, navigate to the directory where you want to view or edit permissions. Right-click the directory, and then click Permissions....

3. In Permissions, on the Security tab, select the Run As User account, and then click Advanced.

   If you are adding your Run As User account, then click Add and follow the Windows process for adding a user account to the Security tab. After you have added the account, then select the Run As User account, and then click Advanced

4. In Advanced Security Settings, on the Permissions tab, select the Run As User account, and then click Advanced.

5. On the Permission Entry, under Basic permissions, verify that Read and Special permissions are selected. Verify that Only apply these permissions to objects and/or containers within this container is not selected.

6. To view or edit Special permissions, click Show advanced permissions.

7. Under Advanced permissions, verify that the permissions enumerated at the beginning of this topic are selected. Verify that Only apply these permissions to objects and/or containers within this container is not selected.

8. If you have set new permissions, then click OK through the multiple windows to finish.

   If you have viewed permissions and not edited anything, then click Cancel to close all windows.

Verify the Local Security Policy

After you specify a Run As User account in Tableau Server Configuration (as described in the topic, Create and Update the Run As User Account), a background process (tabconfig) will update the local security policy on the computer running Tableau Server. Tabadmin will update the local security policy to give "log on as a service" permissions to the Run As User account. This elevated policy is required because the Run As User is used as the security context for the Tableau Server Application Manager service (tabsvc).

**Note:** If the Run As User account that you specify in Tableau Server Configuration is a member of the local administrators or a domain administrator, then tabadmin may not update the local security policy. Updating the Run As User with an account that is a member of local administrators or domain administrators is not a good security practice. We recommend using a domain User account for the Run As User.
In some cases, you may need to manually set security policy for your Run As User. For example, some organizations run Windows Group Policy that remove "Log on as service" rights that have been set on user accounts. Or an organization may run a policy that creates a permission conflict by specifying "Deny log on as a service." If your organization does this, then you will need to disable or edit such Group Policies so that your Run As User account is not affected.

The following procedure describes how to configure security policy, Log on as service, manually. You can also use the procedure below to verify that your Run As User is appropriately configured with local security policy rights. For example, you should verify that the Run As User account is not specified on the Deny log on as service policy.

If you are running a distributed installation, then configuration must be the same across the primary and all worker nodes.

To verify or update the local security policy:

2. In Local Security Policy, open Local Policies, select User Rights Assignments.

   **To verify or set Log on as a service policy:**
a. Right-click **Log on as a service** policy and then click **Properties**.

![Local Security Policy](image)

b. In **Log on as a service** Properties, click **Add User or Group**.

c. Type the `<domain>`\`\<username>` for the Tableau Server Run As User account (for example: `MYCO\tableau_server`), and click **Check Names**.

d. When the account resolves correctly, it is underlined. Click **OK**.

To verify Run As User account is not specified in the Deny log on as a service policy:

a. Right-click **Deny log on as a service** policy, and then click **Properties**.

b. In **Deny log on as a service** Properties, verify that the Run As User account is not listed. If it is, remove it. When you are finished, click **OK**.

3. Click **OK** to close the Local Security Settings windows.
Verify Tableau Service Settings

Confirm that Tableau services are assigned the correct Log On and Startup values. If you are running a distributed installation of Tableau Server, perform these steps on the workers as well as on the primary.

1. Log on as administrator to the computer running Tableau Server.

2. On the Tableau Server computer, select **Start > Control Panel > Administrative Tools > Computer Management > Services and Applications > Services**.

3. Open Services and Applications, then click **Services**. Confirm that the following services have the correct settings:

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Logon Value</th>
<th>Startup Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLEXnet Licensing Service</td>
<td>Local System</td>
<td>Automatic</td>
</tr>
<tr>
<td>Secondary Logon</td>
<td>Local System</td>
<td>Automatic</td>
</tr>
<tr>
<td>Tableau Server Application Manager (tabsvc)</td>
<td><code>&lt;domain&gt;\&lt;username&gt;</code> This is the Run As User account. See below. If you have not specified a Run As User account, then Network Service account is used.</td>
<td>Automatic</td>
</tr>
<tr>
<td>Tableau Server License Manager (tablicsrv)</td>
<td>Local Service</td>
<td>Automatic</td>
</tr>
</tbody>
</table>

The License Manager relies on default Windows folder permissions that are applied to the Local Service. If you are seeing licensing errors in the tabadmin log files, then you may need to modify permissions on the Tableau installation directory.

See Verify Folder Permissions for more information.
<table>
<thead>
<tr>
<th>Service Name</th>
<th>Logon Value</th>
<th>Startup Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Do not change the default settings on the **Recovery** tab of the **Tableau Server Application Manager Properties** dialog box; leave the settings for failure recovery as **Take No Action**. If you change these settings, Tableau Server will restart after being stopped via the `tabadmin` command or **Stop Tableau Server** command.

Changing the Log On Value

To change the **Log On** value for Tableau Server (tabsvc) to the Run As User account:

1. Select **Start > All Programs > Tableau Server > Stop Tableau Server**.
2. Select **Start > All Programs > Tableau Server > Configure Tableau Server**.
3. On the General tab, enter the domain, user name, and password for Tableau Server’s Run As User account.
4. Click **OK**, and then select **Start > All Programs > Tableau Server > Start Tableau Server**.

Revoke Run As User Account Permissions

Changing the Run As User account in Tableau Server Configuration Utility does not remove the permissions from the previous account. Therefore, after you change the Run As User account, we recommend manually revoking permissions from the previous account as a secure best practice. Follow the procedure below to revoke permissions from the previous Run As User account.

If you have changed your Run As User account and your organization uses a forward proxy solution, then you may need to reconfigure the local LAN settings with the new Run As User account. See **Configure a forward proxy server** for more information.
You must be logged onto the Tableau Server computer with an administrator account to perform the following procedures.

Remove folder permissions

Tableau Server configures permissions on Windows folders according to the location where you install Tableau Server. Before you remove folder permissions, review Verify Folder Permissions to identify the resources for which you will need to remove permissions. Run the following procedure for each of the resources you have identified:

1. For each resource (drive, folder, executable), right-click the resource, and then click Properties.
2. On the resource property page, click the Security tab, and then click Edit to change permissions.
3. On the Permissions page, select the previous Run As User account and then click Remove.
4. Click OK.

Remove registry permissions

Remove the previous Run As User account from the following registry locations:

- HKEY_CURRENT_USER\Software\Tableau
- HKEY_LOCAL_MACHINE\Software\Tableau

Warning: Editing the Windows registry incorrectly can have harmful effects on your computer.

1. Open the Registry Editor by entering regedit in Windows Run, and then clicking OK.
2. For each registry directory, right-click the Tableau folder, and then click Permissions.
3. In the Permissions for Tableau page, select the previous Run As User account, and then click Remove.
4. Click OK.
Remove security policies

Remove the previous Run As User account from the following security policies:

- “Log on as service” policy
- “Allow log on locally” policy

1. Select **Start > Control Panel > Administrative Tools > Local Security Policy**.
2. In **Local Security Policy**, open **Local Policies**, select **User Rights Assignments**.
3. For each policy:
   a. Right-click the policy and then select **Properties**.
   b. On the policy property page, select the previous Run As User account, and then click **Remove**.
   c. Click **OK**.

**Configuring Proxies for Tableau Server**

In most enterprises, Tableau Server needs to communicate with the internet. Tableau Server was designed to operate inside a protected internal network. Do not set up Tableau Server directly on the internet or in a DMZ. Instead, communications between your network and the internet should be mediated using proxy servers. Forward proxy servers mediate traffic from inside the network to targets on the internet. Reverse proxy servers mediate traffic from the internet to targets inside the network.

**Who should read this article?**

This article is for IT professionals who are experienced with general networking and gateway proxy solutions. The article describes how and when Tableau requires internet access, and describes how to configure your network and Tableau to use forward and reverse proxy servers for access to and from the internet. There are many third-party proxy solutions available, so some of the content in the article is necessarily generic.

**Important**: We do not recommend installing Tableau Server on a computer that is running IIS. Additionally, if you are running antivirus software, you should follow the recommendations in the Knowledge Base to exclude the Tableau Server directories. The
procedures in this chapter assume that you've installed Tableau Server onto a clean computer.

In this article:

- How Tableau communicates with the internet
- Configure a forward proxy server
- Configure a reverse proxy server

How Tableau communicates with the internet

Tableau Server requires outbound access to the internet for these scenarios:

- Working with maps. Tableau uses map data that is hosted externally.
  
  Tableau Server needs to connect to maps.tableausoftware.com using port 443. If it cannot make this connection, maps may fail to load.

- Licensing. Tableau products connect to the internet to activate license keys. Unless you activate Tableau software with the Offline Activation Tool, all Tableau products must have continuous access to the internet to validate their licenses.

  Tableau Server needs to connection to the following internet locations for licensing purposes:

  - licensing.tableau.com:443
  - o.ss2.us
  - ocsp.rootg2.amazontrust.com
  - ocsp.rootca1.amazontrust.com
  - ocsp.sca1b.amazontrust.com
• crt.sca1b.amazontrust.com
• crt.rootca1.amazontrust.com
• ocsp.sca0a.amazontrust.com
• crt.sca0a.amazontrust.com
• ocsp.sca1a.amazontrust.com
• crt.sca1a.amazontrust.com
• ocsp.sca2a.amazontrust.com
• crt.sca2a.amazontrust.com
• ocsp.sca3a.amazontrust.com
• crt.sca3a.amazontrust.com
• ocsp.sca4a.amazontrust.com
• crt.sca4a.amazontrust.com

Requests to the above domains may be on port 80 or 443.

If Tableau Server cannot make a connection while attempting to activate its license, you will be prompted to do an offline activation.

• Working with external or cloud-based data.

Tableau Server can run without internet access, but in most organizations, the scenarios in the list require Tableau to be able to access the internet.

To configure access to the internet from Tableau Server, you should use a forward proxy.

**Note:** Both Tableau Desktop and Tableau Server need to communicate with the internet for mapping, licensing, and external data. In this article, we focus on Tableau
Server, which has specific requirements for configuring internet access. Do not set up Tableau Server on the computer that's acting as your organization's internet gateway.

In many enterprises, users also need to access Tableau Server from outside the network (that is, from the internet). For example, in many enterprises, users want to be able to reach Tableau Server from their mobile devices in order to interact with views that are stored on the server. To configure access to Tableau Server from the internet or from mobile devices, you should use a reverse proxy.

Configure a forward proxy server

To enable communication from Tableau Server to the internet, deploy Tableau Server behind a forward proxy server. When Tableau Server needs access to the internet, it doesn't send the request directly to the internet. Instead, it sends the request to the forward proxy, which in turn forwards the request. Forward proxies help administrators manage traffic out to the internet for tasks such as load balancing, blocking access to sites, etc.

If you use a forward proxy, you must configure the computers that run Tableau Server inside the network to send traffic to the forward proxy.

**Note:** If you know that none of your users need access to map data or online data sources in the workbooks that they'll be publishing to Tableau Server, and if you are configuring Tableau Server for **offline licensing**, you can skip this section. Otherwise, you'll need to configure Tableau Server to connect to the internet.

Configuring Tableau Server to work with a forward proxy

The steps for configuring internet options on the Tableau Server computer depend on which of these scenarios describes your enterprise:
• **Your organization doesn’t use a forward proxy solution.** If your organization is not running a proxy solution and the computer where you are installing Tableau Server can communicate with the internet, you don’t need to follow the procedures here.

• **A proxy solution is deployed, and automatic configuration files define connection settings.** If your organization uses automatic configuration files (such as PAC or .ins files) to specify internet connection information, you can use this information in the Local Area Network (LAN) Settings dialog box in Windows. For more information, see [Automatic Detection and Configuration of Browser Settings](#) on the Microsoft support site.

• **A proxy solution is deployed, but automatic configuration files are not deployed.** For this scenario, you must configure LAN settings on the Windows computer that is running Tableau Server so that connections to your proxy server are run under the security context of the Run As User account. You must also configure `localhost` and other internal Tableau Server instances as exceptions.

The following procedure describes the steps for the last scenario—a proxy solution without automatic configuration files, where Tableau Server is running on Windows Server.

**Note:** If you are using a distributed installation of Tableau Server, perform the following procedures on the primary server and on each worker node.

**Step 1: Add the Run As User account to the Local Administrators group**

To perform this procedure, you must log onto the Tableau Server computer as the Run As User. By default, the "log on locally" policy is not applied to the Run As User account. Therefore, you must temporarily add the Run As User account to the Local Administrators group.

If you haven’t installed Tableau Server on the computer yet, see [Run As User](#) for more information about creating the Run As User account. If you already installed Tableau Server and set the Run As User setting, you can determine the Run As User account name by
logging onto Tableau Server. The Tableau Server Run As User is listed on the General tab of the Tableau Server Configuration window. To access the configuration utility, in the Windows Start menu, search for Configure Tableau Server.

Add the Run As User to the Local Administrators group using steps in Add a member to a local group on the Microsoft website. When you've finished configuring the forward proxy information, you'll remove the Run As User account from the Local Administrators group.

Step 2: Configure the proxy server in Windows LAN Settings

1. Using the Run As User account, log onto the computer where Tableau Server is installed or will be installed.

2. Open the Local Area Network (LAN) Settings dialog box. (A quick way to get to this dialog box is to search for Internet Options in the Windows Start menu. In the Internet Properties dialog box, click the Connections tab, and then click LAN settings.)

3. Under Proxy server, select Use a proxy server for your LAN, enter the proxy server address and port, and then select Bypass proxy server for local addresses.
Leave this dialog box open and continue to the next step.

Step 3: Add exceptions to bypass the proxy server

You add exceptions to this proxy configuration to guarantee that all communications within a local Tableau Server cluster (if you have one now or will have one later) do not route to the proxy server.

1. In the LAN settings dialog box, click Advanced. (This button is available only if you’ve selected the option to use a proxy server for your LAN.)

2. In the Proxy Settings dialog box, enter localhost in the Exceptions field. In addition, enter the server names and IP addresses of other Tableau Server computers in the same cluster. Use semicolons to separate items.

3. Close the proxy settings dialog box and the Local Area Network (LAN) Settings dialog
box.

4. In the Internet Properties dialog box, click OK to apply the settings.

Stay logged onto the computer and continue to the next step.

Step 4: Test the proxy configuration

To test the new configurations, while still logged on as the Run As User on the Tableau Server computer, open a web browser and test the following Tableau mapping URL:

Miami and Havana (blue water)

This is the URL:

https://maps.tableausoftware.com/tile/d/mode=named|from=tableaul_2_base/-mode=named|from=tableaul_2_admin0_borders/mode=named|from=tableaul_2_place_labels/ol/6/17/27.png?apikey=ttab56540ba691a909b0f7d2af0f6fe7"

If the configuration is working, you see a map of Miami and Havana. This indicates that the Tableau Server computer is able to access the internet through the proxy.

Step 5: Remove the Run As User account from the Local Administrator group

After you have tested the proxy settings, remove the Run As User account from the Local Administrators group. Leaving the Run As User in the administrator group unnecessarily elevates the permissions of the Run As User group and is a security risk.

Restart Tableau Server to ensure that all changes are implemented.

Configure a reverse proxy server

A reverse proxy is a server that receives requests from external (internet) clients and forwards them to Tableau Server. Why use a reverse proxy? The basic answer is security. A reverse proxy makes Tableau Server available to the internet without having to expose the individual IP address of that particular Tableau Server to the internet. A reverse proxy also
acts as an authentication and pass-through device, so that no data is stored where people outside the company can get to it. This requirement can be important for organizations that are subject to various privacy regulations such as PCI, HIPAA, or SOX.

How a reverse proxy works with Tableau Server

The following diagram illustrates the communication path when a client makes a request to Tableau Server that is configured to work with a reverse proxy server.

1. An external client initiates a connection to Tableau Server. The client uses the public URL that's been configured for the reverse proxy server, such as https://tableau.example.com. (The client doesn't know that it's accessing a reverse proxy.)

2. The reverse proxy maps that request in turn to a request to Tableau Server. The reverse proxy can be configured to authenticate the client (using SSL/TLS) as a pre-condition to passing the request to Tableau Server.

3. Tableau Server gets the request and sends its response to the reverse proxy.

4. The reverse proxy sends the content back to the client. As far as the client is concerned, it just had an interaction with Tableau Server, and has no way to know that the communication was mediated by the reverse proxy.

Proxy servers and SSL

For better security, you should configure reverse proxy servers to use SSL for any traffic that's external to your network. This helps to ensure privacy, content integrity, and authentication. Unless you’ve deployed other security measures to protect traffic between your
internet gateway and Tableau Server, we also recommend configuring SSL between the
gateway proxy and Tableau Server. You can use internal or self-signed certificates to
encrypt traffic between Tableau Servers and other internal computers.

Reverse proxy and user authentication

Tableau Server will always authenticate users. This means that even if you are authen-
ticating inbound connections at the gateway for your organization, Tableau Server will still
authenticate the user. Therefore, we recommend a transparent scenario where Tableau
Desktop, Tableau Mobile, or browser user requests are not prompted for authentication at
the gateway. This recommendation doesn’t prohibit using SSL for client/server system-level
authentication at the gateway proxy, in fact, we strongly recommend SSL system-level
authentication.

You can use SAML, OpenID Connect, or Trusted Tickets with a reverse proxy.

If your organization is authenticating with Active Directory:

- Active Directory with Enable automatic logon (SSPI) is not supported with a reverse
  proxy.
- Tableau Server must be configured for reverse proxy before configuring Tableau
  Server for Kerberos. For more information, see Configure Kerberos.

Configure Tableau Server to work with a reverse proxy server

Before you configure Tableau Server, you’ll need to collect the following information about
the proxy server configuration. To configure Tableau Server, you use the `tabadmin` utility.
The information you need to collect corresponds to options you’ll need when you run tabad-
min.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Corresponding <code>tabadmin</code> option</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address or</td>
<td>You can either enter an IP address or a CNAME for this option.</td>
<td><code>gateway.trusted</code></td>
</tr>
<tr>
<td>CNAME</td>
<td>The public IP address or addresses</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Corresponding tabadmin option</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>of the proxy server. The IP address must be in IPv4 format, such as 203.0.113.0, and it must be a static IP. If you are unable to provide a static IP, or if you are using cloud proxies or external load balancers, you can specify the CNAME (Canonical Name) DNS value that clients will use to connect to Tableau Server. This CNAME value must be configured on your reverse proxy solution to communicate with Tableau Server.</td>
<td>gateway.public.host</td>
</tr>
<tr>
<td>FQDN</td>
<td>The fully qualified domain name that people use to reach Tableau Server, such as tableau.example.com. Tableau Server doesn't support a FQDN with information beyond the domain name, such as example-.com/tableau.</td>
<td>gateway.public.host</td>
</tr>
<tr>
<td>Non-FQDN</td>
<td>Any subdomain names for the proxy server. In the example of tableau-.example.com, the subdomain name is tableau.</td>
<td>gateway.trusted_hosts</td>
</tr>
<tr>
<td>Aliases</td>
<td>Any public alternative names for the proxy server. In most cases, aliases are designated using CNAME val-</td>
<td>gateway.trusted_hosts</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Corresponding tabadmin option</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>ues. An example would be a proxy server <code>bigbox.example.com</code> and CNAME entries of <code>ftp.example.com</code> and <code>www.example.com</code>.</td>
<td></td>
</tr>
<tr>
<td>Ports</td>
<td>Port numbers for traffic from the client to the reverse proxy server.</td>
<td><code>gateway.public.port</code></td>
</tr>
</tbody>
</table>

If you are using a distributed installation of Tableau Server, then run the following procedure on the primary node in your cluster.

1. **Open a command prompt and navigate to the Tableau Server bin directory.**

   1. Open a command prompt as an administrator:

   ![Command Prompt as Administrator](image)

   2. Enter the following to change to the folder where `tabadmin.exe` is located:
cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"

2. Enter the following command to stop Tableau Server:

    tabadmin stop

3. Enter the following command to set the FQDN that clients will use to reach Tableau Server through the proxy server, where *name* is the FQDN:

    tabadmin set gateway.public.host "name"

    For example, if Tableau Server is reached by entering https://tableau.example.com in the browser, enter this command:

    tabadmin set gateway.public.host "tableau.example.com"

4. Enter the following command to set the address or the CNAME of the proxy server, where *server_address* is the IPv4 address or CNAME value:

    tabadmin set gateway.trusted "server_ip_address"

    If your organization uses multiple proxy servers, enter multiple IPv4 addresses, separating them with commas. IP ranges are not supported. To improve start up and initialization of Tableau Server, minimize the number of entries for gateway.trusted.

5. Enter the following command to specify alternate names for the proxy server, such as its fully qualified domain name, any not fully qualified domain names, and any aliases. If there’s more than one name, separate the names with a comma.

    tabadmin set gateway.trusted_hosts "name1, name2, name3"

    For example:

    tabadmin set gateway.trusted_hosts "proxy1.example.com, proxy1, ftp.example.com, www.example.com"
6. If the proxy server is using SSL to communicate with the internet, run the following command, which tells Tableau that the reverse proxy server is using port 443 instead of port 80:

```
tabadmin set gateway.public.port "443"
```

**Note:** If the proxy server is using SSL to communicate with Tableau Server, SSL must be configured and enabled on Tableau Server. See Configure External SSL.

7. Enter the following command to commit the configuration change:

```
tabadmin config
```

8. Enter the following command to restart the server:

```
tabadmin start
```

Configure the reverse proxy server to work with Tableau Server

When a client accesses Tableau Server through a reverse proxy, specific message headers have to be preserved (or added). Specifically, all proxy servers in the message chain must be represented in the `gateway.trusted` and `gateway.trusted_hosts` settings.

The following graphic shows example headers for a single-hop message chain, where the proxy server is communicating directly with Tableau Server:
The following graphic shows example headers for a multiple-hop message chain, where the message traverses two proxy servers before connecting to Tableau Server:

The following table describes what these headers are and how they relate to the configuration settings on Tableau Server:

<table>
<thead>
<tr>
<th>Headers</th>
<th>Description</th>
<th>Related Tableau Server settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMOTE_ADDR and X-FORWARDED-FOR (XFF)</td>
<td>Tableau Server needs these headers to determine the IP address of origin for requests. X-FORWARDED-FOR header must present IP address chain to Tableau Server in the order the connections have occurred.</td>
<td>The IP address that you set in gateway.trusted must match the IP presented in REMOTE_ADDR. If you sent multiple addresses in gateway.trusted, one of them must match the IP presented in REMOTE_ADDR.</td>
</tr>
<tr>
<td>HOST and X-FORWARDED-HOST (XFH)</td>
<td>These headers are used to generate absolute links to Tableau Server when it replies to the client. X-FORWARDED-HOST header must present host names to Tableau Server in the order the connections have occurred.</td>
<td>The host names that are presented in X-FORWARDED-HOST header must be included in the host names that you specify in gateway.trusted_hosts.</td>
</tr>
</tbody>
</table>
This header is required if SSL is enabled for traffic from the client to the proxy, but not for traffic from the proxy to Tableau Server.

The **X-FORWARDED-PROTO** headers are important for scenarios where HTTP or HTTPS is not maintained along each hop of the message route. For example, if the reverse proxy requires SSL for outside requests, but traffic between the reverse proxy and Tableau Server is not configured to use SSL, **X-FORWARDED-PROTO** headers are required. Some proxy solutions add the **X-FORWARDED-PROTO** headers automatically, while others do not. Finally, depending on your proxy solution, you might have to configure port forwarding to translate the request from port 443 to port 80.

Port configuration on reverse proxy (inbound connections from client and outbound connections to Tableau Server) must be specified in the corresponding parameter: `gateway.public.port`, which is the port clients use to connect to the proxy.

If the proxy server is using SSL to communicate with Tableau Server, SSL must be configured and enabled on Tableau Server. See [Configure External SSL](#).

### Validate reverse proxy setup

To validate your reverse proxy setup, perform the following tasks from a computer on the internet.

<table>
<thead>
<tr>
<th>Task</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log in to Tableau Server from Tableau Desktop.</td>
<td>Sign in to Tableau Server or</td>
</tr>
</tbody>
</table>
More Deployment Resources for Tableau Server

Everybody's Install Guide

Installing Tableau Server is about as easy as it gets with server software. Still, if you're new to it, you can use someone to help you figure out what to prepare and how to go through it. And now we've got you covered.

To plan for, install, and manage a single-machine instance of Tableau Server, see the Everybody's Install Guide.

Desktop Deployment Guide

Tableau Desktop lets your users create workbooks and views, dashboards, and data sources and then publish this content to either Tableau Online or Tableau Server.

To install Desktop for yourself or for others, see the Tableau Desktop Deployment Guide.
Tableau Mobile Deployment Guide

Tableau Mobile lets your users stay on top of critical data—anywhere they go. This free iOS and Android app lets users explore and share content published to either Tableau Online or Tableau Server 8.2 and later.

For detailed information about app deployment, customization, and security, see the Tableau Mobile Deployment Guide.

Install and Configure

Run Server Setup

After you download the Tableau Server installation file, follow the instructions below to install the server.

1. Double-click the installation file.

2. Follow the on-screen instructions to complete Setup and install the application.
The default installation path is `C:\Program Files\Tableau\Tableau Server`. You can choose a different location, including a different drive, either by browsing to or typing in a new path.

**Note:** When you upgrade a Tableau Server that's been installed to a non-default location, you need to navigate to that non-default path during the upgrade. For details, see Upgrade Tableau Server to a Non-Default Location.

3. After the installation completes, click **Next** to open the Product Key Manager window.

If you need to support characters that are not the Latin-1 set, install the Windows Language Packs via **Control Panel > Regional and Language Options**. The language packs will need to be installed on the primary server as well as any worker machines.
Activate Tableau Server

Tableau Server requires at least one product key that both activates the server and specifies the number of license levels you can assign to users. You can access your product keys from the Tableau Customer Account Center. After installing and configuring the server, the product key manager automatically opens so you can enter your product key and register the product.

If you need to activate Tableau Server on a computer that is offline, see Activate Tableau Server Offline. If you need to activate additional product keys to add capacity to an existing Tableau Server installation, see Add Capacity to Tableau Server.

If you are activating Tableau Server as part of the install process, the Product Key Manager opens automatically. If you need to open it, in Windows, click Start > All Programs > Tableau Server <version> > Manage Product Keys.

**Note:** You can also find instructions for activating and registering Tableau Server on the download help page.
1. Select **Activate the product**:

![Activate Tableau](image)

2. Enter or paste your product key and click **Activate**.

3. Click **Continue**.

4. Enter the fields to register Tableau and click **Register**.

5. Restart Tableau Server after registration is complete.

### Activate Tableau Server Offline

If you are working offline you can follow the steps below to complete offline activation.

1. When the product key manager opens click **Activate the product**.

   Paste your server product key into the corresponding text box and click Activate. You can get your product key from the Tableau Customer Portal.
2. When you are offline, activation will fail and you are given the option to save a file that you can use for offline activation. Click **Save**.

3. Select a location for the file and click **Save**. The file is saved as **offline.tlq**.

4. Back in Tableau click **Exit** to close the Activation dialog box.

5. From a computer that has Internet access, open a web browser and visit the **Product Activations** page on the Tableau website. Complete the instructions to submit your offline.tlq file.

   After you submit your offline.tlq file online, while your browser is still displaying the Product Activations page, a file called **activation.tlf** is created, and Tableau prompts you to save the file to your computer.

6. Save the activation.tlf file and move it to the computer where you are installing Tableau Server.

7. On the computer where you are installing Tableau Server, open a command prompt as an administrator and run the following command:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

8. Next, type **tabadmin activate --tlf <path>\activation.tlf**, where `<path>` is the location of the response file you saved from the Product Activations page. For example:

   ```
   tabadmin activate --tlf \Desktop\activation.tlf
   ```

   Keep the command prompt window open.

9. After the license is initialized, you are prompted to activate the product again. On Tableau Server, click **Start > All Programs > Tableau Server 10.2**

10. Right-click **Manage Product Keys** and select **Run as Administrator**.
Even if you are logged into the Tableau Server computer as an administrator, you need to do this to avoid a potential registration error.

11. Click **Activate the product**.

12. Enter your product key again (the same one you entered in step 1).

13. Save the .tlq file.

14. From a computer that has Internet access, open a web browser and visit the **Product Activations** page again on the Tableau website. Complete the instructions.

   Tableau will again create a file called **activation.tlf** and prompt you to save it.

15. Save the file and move it to the computer where you are installing Tableau Server.

16. Back in the command prompt window on Tableau Server, type `tabadmin activate --tlf <path>\activation.tlf`, where `<path>` is the location of the second response file you saved from the Product Activations page. For example:

   ```
   tabadmin activate --tlf \Desktop\activation.tlf
   ```

   Tableau Server is now activated. If you need additional assistance, contact **Tableau Technical Support**.

**Configure Tableau Server**

The Tableau Server Configuration utility opens during a Tableau Server installation. You can set configuration options at this time, as part of the installation, before the server starts. The server is started at the end of the installation process.

You can also run the utility after installing Tableau Server by selecting **All Programs > Tableau Server 10.2 > Configure Tableau Server** on the Windows Start menu. You need to stop the server before making any configuration changes. See **Reconfigure the Server** for steps.
There are two things to keep in mind about the settings you specify in the Configuration dialog box:

- **Settings are system-wide**: The settings you enter apply to the entire server. If the server is running multiple sites, these settings affect every site.

- **User Authentication is "permanent"**: The User Authentication setting (on the General tab) can only be set when you are installing Tableau Server for the first time. You can change all of the other settings after installation by stopping the server and rerunning the Configuration utility.

See the topics below for details on the different Configuration tabs:

**Configure General Server Options**

Use the following sections to help you configure options on the General tab:

- **Server Run As User**
- **User Authentication**
- **Gateway**
- **Firewall**
- **Sample data**
- **Upload Crash Data**

**Server Run As User**

By default, Tableau Server runs under the Network Service account. To use an account that will accommodate NT authentication with data sources, specify a user name and password. The user name should include the domain name. See Run As User to learn more about using a specific user account.
User Authentication

Select whether to use **Active Directory** to authenticate users on the server. Select **Use Local Authentication** to create users and assign passwords using Tableau Server’s built-in user management system. You cannot switch between Active Directory and Local Authentication later.

Tableau Server supports several types of SSO solutions: OpenID, SAML, and Kerberos. It’s important to understand how the decision about whether to use Active Directory or local authentication affects SSO:

- OpenID requires local authentication.
- Kerberos requires Active Directory authentication.
- SAML works with either Active Directory or local authentication. However, if you plan to configure Tableau Server for site-specific SAML authentication, you must select local authentication.

If you use Active Directory:

You can optionally **Enable automatic logon**, which uses Microsoft SSPI to automatically sign in your users based on their Windows username and password. This creates an experience similar to single sign-on (SSO). Do not select **Enable automatic logon** if you plan to configure Tableau Server for SAML, trusted authentication, or for a proxy server.
Be sure to type the fully qualified domain name (FQDN) and nickname (NetBIOS name).

**To determine the FQDN:** Select **Start > Run** then type `sysdm.cpl` in the Run textbox. In the System Properties dialog box, select the **Computer Name** tab. The FQDN is shown near the middle of the dialog box. The first time your users sign in, they will need to use the fully qualified domain name (for example, `myco.lan\jsmith`). On subsequent sign-ins, they can use the nickname (NetBIOS name), for example, `myco\jsmith`.

The default port for web access to Tableau Server (via HTTP) is port 80. If the installation program determines that port 80 is in use when you first install Tableau Server, an alternate port (for example 8000) is used and shown in the Port number box.

You may need to change the port for other networking needs, for example, if you have a hardware firewall or proxy in front of the Tableau Server host, this might make running a back-end system on port 80 undesirable.

**Gateway**

<table>
<thead>
<tr>
<th>Gateway</th>
<th>HTTP ports other than the default are supported and may be set here.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port number:</td>
<td>80</td>
</tr>
</tbody>
</table>

**Firewall**

Select whether to open a port in Windows firewall. If you do not open this port, users on other machines may not be able to access the server.

| Port number: | 80 |

- **Open port in Windows firewall**
- **Include sample data and users**

**Sample data**
Select whether to include sample data and users. The **Include sample data and users** option installs several sample workbooks and data, which can help you get familiar with Tableau Server (especially if you are installing a trial version of the product). If you select **Include sample data and users**, the first user created in Tableau Server will be assigned as the owner of sample workbooks and data. To change the assigned owner, see Manage Ownership.

Server Crash Reporter

Select whether to allow Tableau Server to upload crash data. If you select the **Enable Crash Uploading** option, Tableau Server will upload crash data if the server crashes. Crash data is packaged and encrypted, then uploaded no more than once a day, at the scheduled time. Tableau will use this data to help identify and eliminate issues that can cause crashes.

**Important:** Do not select this option if your data is subject to any privacy regulations.

For more information, see Server Crash Reporter.

You can continue to the next page to configure Caching and Initial SQL options. If you do not want to configure these options click **OK**.

**Configure Data Connections**

Use the options on the Data Connections tab to configure caching and specify how you want to handle initial SQL statements from data sources.

**Caching**

Views published to Tableau Server are interactive and sometimes have a live connection to a database. As users interact with the views in a web browser, the data that is queried gets stored in a cache. Subsequent visits will pull the data from this cache if it is available. The
Data Connections tab is where you configure aspects of caching that will apply to all data connections:

To configure caching, select from one of the following options:

- **Refresh Less Often**—Data is cached and reused whenever it is available regardless of when it was added to the cache. This option minimizes the number of queries sent to the database. Select this option when data is not changing frequently. Refreshing less often may improve performance.

- **Balanced**—Data is removed from the cache after a specified number of minutes. If the data has been added to the cache within the specified time range the cached data
will be used, otherwise new data will be queried from the database.

- **Refresh More Often**—The database is queried each time the page is loaded. The data is still cached and will be reused until the user reloads the page. This option will ensure users see the most up to date data; however, it may decrease performance.

Regardless of how caching is configured, the user can click the **Refresh Data** button on the toolbar to force the server to send a query and retrieve new data.

Initial SQL

When connecting to some data sources, you can specify an initial SQL command to run when you open the workbook, refresh an extract, sign in to Tableau Server, or publish to Tableau Server. If your data source supports running an initial SQL statement, an **Initial SQL** link appears in the lower-left corner of the Server Connection dialog box in Tableau Desktop.

For performance or security reasons, some administrators may want to disable this functionality. The **Data Connections** tab is where you do this:
To disable initial SQL functionality, select the **Ignore initial SQL statements for all data sources** check box. Workbooks created with initial SQL statements will still open but the initial SQL commands will not be sent.

**Server Crash Reporter**

The Tableau Server administrator can enable an option to allow logs and related files to be sent to Tableau when the server has an issue that results in a crash. These files are used by Tableau to identify and address issues that cause crashes. By default this option is disabled, and it should only be enabled in organizations that are not subject to regulations related to data privacy.
**Important:** Do not select this option if your data is subject to any privacy regulations.

If Tableau Server has a problem that results in a crash, log files and dump files are generated. If the crash data upload feature is enabled, these files are automatically gathered and zipped into an encrypted package that is sent in the background, at the scheduled time. The encrypted package is sent in small pieces to limit impact to network performance. Only one crash report is packaged and uploaded at a time (a new crash report is not packaged until the previous package has been uploaded) and is sent in a "first in, first out" order. You can schedule the sending for a low-use window to further reduce any impact to your users.

The encrypted package is made up of standard Windows crash dump files and logs that include the following:

- Crash/Core Dump files (*.dmp)
- Error log files related to the crash (*.log)
- Manifest files related to the crash (*.manifest)

The files can contain data that includes:

- Machine-specific information (for example: hardware, operating system, domain).
- A snapshot of the contents of memory at the time of the crash, including application activity details like information about data connections, actions taken by the user in Tableau, and data being worked on in Tableau.
- Tableau information including customer-identifiable information.

See Also:

- Server Crash Reporter

**Servers**

Use the options on the Servers tab to do the following:
• Adjust the number of processes running on Tableau Server,

• Configure a distributed Tableau Server environment, and

• Select the preferred active repository for failover situations.

You can also use the Server tab to add computers on which to run Tableau Server processes.

Number of processes per server

Tableau Server deployments run multiple processes. You can choose to run the processes one computer, or to distribute them across multiple computers. To improve performance, you can adjust the number of processes that run on each computer, for each process type.

For more information on changing the number of server processes for a single-server environment, see Reconfigure Processes.

For more information on how many processes to run in order to improve performance, see Performance Tuning Examples.

For more information on setting up a multi-server, or distributed, environment, see Distributed Environments.
Preferred active repository

When you configure Tableau Server after the initial installation, you have the option to specify a **Preferred Active Repository**. This is an optional step, and if you do not specify a preferred active repository, Tableau Server will select the active repository on startup.

<table>
<thead>
<tr>
<th>Preferred Active Repository</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon startup, Tableau Server prefers this host as Active Repository when configured for failover.</td>
</tr>
<tr>
<td>Select host:</td>
</tr>
<tr>
<td>(No preference)</td>
</tr>
<tr>
<td>10.32.139.30</td>
</tr>
<tr>
<td>10.32.139.21</td>
</tr>
</tbody>
</table>

Configure a preferred active repository if you want Tableau Server to select a specific node on startup. You might want to do this if you have a particular server you want to use for your active repository (a computer with more disk space or memory for example), or if you are using custom administrative views. Custom administrative views have embedded connection information that refers to the repository for which you created the views. For more information on connecting to the Tableau Server repository, see Collect Data with the Tableau Server Repository.

Install Tableau Server on a Two-Node Cluster

When you install Tableau Server on a two-node cluster, you can install server processes on one or both nodes. A two-node cluster can improve the performance of Tableau Server, because the work is spread across multiple machines.

Note the following about two-node clusters:

- A two-node cluster does not provide failover or support for high availability.

- You can’t install more than one instance of the repository on a two-node cluster, and the repository must be on the primary node.

If you need failover or high availability, or want a second instance of the repository, you must install Tableau Server on a cluster of at least three computers. In a cluster that includes at
least three nodes, you can configure two instances of the repository, which gives your cluster failover capability.

The repository is installed on the primary node by default. To move it to the worker node in a two-node installation, you need to follow manual steps using tabadmin. For more information, see Move the Repository Process in a Two-Node Installation.

Primary Server Installation Defaults

By default, the Tableau Server installer configures the number of process instances that Tableau Server runs based on the hardware detected by the installer. The default configuration applies to single-server installations and to the primary server of a multi-server installation.

You can calculate the default configuration based on the following rules for each process, where the number of cores refers to the number of logical CPU cores:

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Number of Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VizQL Server</td>
<td>Equal to the number of cores divided by four, up to a maximum of four process instances.</td>
</tr>
<tr>
<td>Backgrounder</td>
<td>Set to two unless the number of cores is fewer than eight.</td>
</tr>
<tr>
<td>Cache Server</td>
<td>Set to two unless the number of cores is fewer than eight.</td>
</tr>
<tr>
<td>Data Server</td>
<td>Set to two unless the number of cores is fewer than eight.</td>
</tr>
</tbody>
</table>

For all other process types, the number of process instances is set to one, regardless of the hardware.

Here’s an example default configuration for a computer with 16-cores:

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Number of Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VizQL Server</td>
<td>4</td>
</tr>
<tr>
<td>Application Server</td>
<td>1</td>
</tr>
<tr>
<td>Process Name</td>
<td>Number of Processes</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Backgrounder</td>
<td>2</td>
</tr>
<tr>
<td>Cache Server</td>
<td>2</td>
</tr>
<tr>
<td>Data Server</td>
<td>2</td>
</tr>
<tr>
<td>Data Engine</td>
<td>1</td>
</tr>
</tbody>
</table>

Distributed Installation Recommendations

When you add computers (workers) to a Tableau Server installation, you must decide how many processes to run on each computer. This page provides some general recommendations that are intended only as a starting point.

In addition to these general recommendations, you should also:

- Understand how your organization uses Tableau Server and tune your configuration for your use case—for example, whether you want to optimize for user response or for extract refreshes.

- Perform thorough performance testing to identify the best places to adjust process configuration.

For more information on tailoring a Tableau Server installation to your organization’s needs, see Performance Tuning Examples.

For more information on the requirements for a distributed installation and for information on configuring workers, see Distributed Environments.

Recommendations for all installations

Although the computers that make up a Tableau Server cluster do not need to have identical hardware, they must all meet the same minimum system requirements. The recommendations on this page assume that the computers where you install Tableau Server have eight cores or more.
The following recommendations apply to all server configurations:

- Run Backgrounder processes on a dedicated computer, especially if you plan on refreshing extracts frequently. Backgrounder processes are generally the most CPU intensive and can slow down other processes on the same computer.

- Run Data Engine processes on a different computer than Backgrounder processes. Because Data Engine processes are also CPU intensive, you can prevent CPU bottlenecks by hosting the Data Engine processes and the Backgrounder processes on separate nodes.

- If you plan to refresh extracts frequently or if you plan to refresh large extracts, increase the number of processes for Backgrounder and Data Engine processes.

**Note:** In a distributed installation with three or more nodes, you can have a maximum of two repository instances (active and passive). You can also run Tableau Server with one repository, but doing this means there is no failover available for the repository. For more information, see Tableau Server Repository.

**Configure SMTP Setup**

Tableau Server can send email to alert system administrators if there is a system failure and can email subscriptions (snapshots of selected views) to system users. For this functionality to work, you need to first configure the SMTP server that Tableau Server uses to send email.

1. In the Tableau Server Configuration utility, click the **SMTP Setup** tab.

2. Under **SMTP Server**:
   
   a. Enter the name of your SMTP server.

   b. (Optional) If your account requires it, enter a user name and password for your SMTP server account.

   c. If you are not using the default SMTP port 25, change the SMTP port value.
d. Leave the **Enable TLS** box cleared so the connection to your mail server is unencrypted.

Encrypted SMTP connections are not supported for alerts or subscriptions.

![Tableau Server Configuration](image)

3. For **Send email from**, enter the email address that will send an alert if there's a system failure. The email address must have valid syntax (for example, ITalerts@bigco.com or noreply@mycompany), but it does not have to also be an actual email account on Tableau Server.

   **Note**: Some SMTP servers may require this to be an actual email account. You can override the system-wide **Send email from** address on a per-site basis for subscriptions. For more information, see What is a Site?

4. For **Send email to**, enter at least one email address that will receive the alerts. If you
enter multiple addresses, separate them with commas.

5. For Tableau Server URL, enter http:// or https://, followed by the name or IP address of the Tableau server. This value will be used for the footer of subscription emails.

6. Click OK.

When you start the server it will trigger an email alert. This confirms that you have set up alerts correctly.

Configure Server Alerts

On the Alerts and Subscriptions tab of the Tableau Server Configuration utility, you can configure the following server alerts:

- Email alerts for system failures
- Disk space usage:
  - Recording usage history
  - Email alerts when space crosses or remains below pre-configured thresholds

In the same part of the utility, you can also enable emails for subscriptions to views. For detailed information, see Set Up Subscriptions.

**Note:** You need to configure SMTP before you can configure subscriptions or alerts. For more information, see Configure SMTP Setup.

Alerts for system failures

Tableau Server can send email alerts to server administrators when there is a system failure.

When you configure alerts, Tableau Server sends an email to the recipients listed in Send email to on the SMTP Setup tab any time that the data engine, repository, or gateway
server processes stop or restart, or any time the primary Tableau Server stops or restarts. If you are running a single-server installation (all processes on the same machine), health alerts are only sent when Tableau Server is up. No "down" alerts are sent. If you are running a distributed installation that's configured for failover (see Configure for Failover and Multiple Gateways), a DOWN alert means that the active repository or a data engine instance has failed and the subsequent UP alert means that the passive instance (repository) or second instance (data engine) of that process has taken over.

To configure email alerts for system failures

1. On the Alerts and Subscriptions tab of the Tableau Server Configuration utility, select Send email alerts for server component up, down, and failover events.

![Tableau Server Configuration Utility](image)

2. Click OK.

Disk space monitoring

If Tableau Server is configured to monitor free disk space and send alerts about low disk space, when space on any node in a server installation drops below the configured thresholds, Tableau Server sends an email to the recipients listed in Send email to on the SMTP Setup tab.

Disk space usage

When you configure Tableau Server to record disk space usage, information about free disk space is saved in the Repository and you can view the usage history using the
Administrative Views.

To configure Tableau Server to record disk space usage

1. On the **Alerts and Subscriptions** tab of the Tableau Server Configuration utility, select **Record disk space usage information, including threshold violations**.

2. Click **OK**.

You can configure Tableau Server to send email alerts when disk space usage on any node crosses a threshold, or remains below the threshold.

To configure email alerts for low disk space

1. On the **Alerts and Subscriptions** tab of the Tableau Server Configuration utility, select **Send alerts when unused drive space drops below thresholds**.
2. In **Warning threshold**, enter the percentage of free disk space that Tableau Server should use as a warning threshold.

If free disk space on any node in your Tableau Server cluster drops below this percentage, Tableau Server sends a warning alert email. Alerts continue until free disk space rises above the threshold. To configure the frequency of alerts, see Step 4 below.

3. In **Critical threshold**, enter the percentage of free disk that Tableau Server should use as a critical threshold.

If free disk space on any node in your Tableau Server cluster drops below this percentage, Tableau Server sends a critical alert email. Alerts continue until free disk space rises above the threshold. To configure the frequency of alerts, see Step 4 below.

4. In **Send email alert every**, enter the number of minutes for how often Tableau Server should send an alert.

5. Click **OK**.
Configure External SSL

You can configure Tableau Server to use Secure Sockets Layer (SSL) encrypted communications on all external HTTP traffic. Setting up SSL ensures that access to Tableau Server is secure and that sensitive information passed between the web browser and the server or Tableau Desktop and the server is protected. Steps on how to configure the server for SSL are described in the topic below; however, you must first acquire a certificate from a trusted authority, and then import the certificate files into Tableau Server. If you are running a Tableau Server cluster and you want to use SSL, see Configure SSL for a Cluster, below, for recommendations.

1. Acquire an Apache SSL certificate from a trusted authority (for example, Verisign, Thawte, Comodo, GoDaddy). You can also use an internal certificate issued by your company. Wildcard certificates, which allow you to use SSL with many host names within the same domain, are also supported.

   **Note:** Be sure to use a SHA-2 (256 or 512 bit) certificate. All major browsers will display warnings when connecting to SHA-1 certificates. By the end of 2017, it’s likely that most browsers will no longer connect to servers that are presenting SHA-1 certificates.

   Some browsers will require additional configuration to accept certificates from certain providers. Refer to the documentation provided by your certificate authority.

2. Place the certificate files in a folder named SSL, parallel to the Tableau Server 10.2 folder. For example:

   C:\Program Files\Tableau\Tableau Server\SSL

   This location gives the account that’s running Tableau Server the necessary permissions for the files. You may need to create this folder.

3. Open the Tableau Server Configuration Utility by selecting **Start > All Programs >**
4. In the Configuration Tableau Server dialog box, select the **SSL** tab.

![Tableau Server Configuration](image.png)

5. Select **Use SSL for server communication** and provide the location for each of the following certificate files:

- **SSL certificate file**—Must be a valid PEM-encoded x509 certificate with the extension .crt.
- **SSL certificate key file**—Must be a valid RSA or DSA private key file (with the extension .key by convention). If the certificate key file requires a passphrase enter it in the field, **SSL certificate key passphrase**. (The passphrase you enter will be encrypted while at rest). Alternatively, you can provide a path to a key file that is not passphrase protected.

**Note:** If you create a certificate key file with a passphrase, you cannot reuse the SSL certificate key for SAML.

- **SSL certificate chain file** (Optional for Tableau Server, required for Tableau Mobile and Tableau Desktop on the Mac)—Some certificate
providers issue two certificates for Apache. The second certificate is a chain file, which is a concatenation of all the certificates that form the certificate chain for the server certificate. All certificates in the file must be x509 PEM-encoded and the file must have a .crt extension (not .pem).

6. (optional) If you are using SSL for server communication and want to configure SSL communication between Tableau Server and clients using certificates on both the server and clients:

- Select **Use mutual SSL and automatic login with client certificates**.

  **Note:** Tableau Server does not support mutual SSL and SAML together.

- In **SSL CA certificate file**, browse to the location for the certificate file. The SSL CA certificate file must be a valid PEM-encoded x509 certificate with the extension .crt.

  **Note:** If you have multiple trusted Certificate Authorities (CAs) you can copy and paste the entire contents of each CA certificate, including the "BEGIN CERTIFICATE" and "END CERTIFICATE" lines, into a new file, then save the file as CAs.crt. In **SSL CA certificate file**, browse to the location of this new file.

7. Click **OK**. The changes will take effect the next time the server is restarted.

When the server is configured for SSL, it accepts requests to the non-SSL port (default is port 80) and automatically redirects to the SSL port 443.

**Note:** Tableau Server only supports port 443 as the secure port. It cannot run on a computer where another application is using port 443.
SSL errors are logged in the install directory at the following location. Use this log to troubleshoot validation and encryption issues:

C:\ProgramData\Tableau\Tableau Server-\data\tabsvc\logs\httpd\error.log

Configure SSL for a Cluster

You can configure a Tableau Server cluster to use SSL. If the primary Tableau Server computer is the only node that is running the gateway process (which it does by default), then that's the only place where you need to configure SSL. See the procedure above for steps.

SSL and Multiple Gateways

A highly available Tableau Server cluster can include multiple gateways, fronted by a load balancer (learn more). If you are configuring this type of cluster for SSL, you have two choices:

- **Configure your load balancer for SSL.** Traffic is encrypted from the client web browsers to the load balancer. Traffic from the load balancer to the Tableau Server gateway processes is not encrypted. No SSL configuration in Tableau Server is required, it's all handled by your load balancer.

- **Configure Tableau Server for SSL:** Traffic is encrypted from the client web browsers to the load balancer, and from the load balancer to the Tableau Server gateway processes. See the procedure below for details.

Configure a Server Cluster for SSL

When you configure a Tableau Server cluster to use SSL, you place the SSL certificate and key files on every computer that's running a gateway process. To configure a Tableau Server cluster to use SSL:

1. Configure the external load balancer for SSL passthrough. Or if you want to use a port other than 443, you can configure the external load balancer to terminate the non-standard port from the client. In this scenario, you would then configure the load
balancer to connect to Tableau Server over port 443. Refer to your load balancer’s documentation for assistance.

2. Make sure that the SSL certificate you use was issued for the load balancer’s host name.

3. Configure the primary Tableau Server node as described in the procedure above.

4. Place the same SSL certificate and key file that you used for the primary on each Tableau Server worker node that is running a gateway process. Use the same folder location on the workers that you used on the primary.

If you are using mutual ssl, place the SSL CA certificate file you used for the primary on each worker node that is running a gateway process. Use the same folder location that you used on the primary.

You do not need to do any additional configuration on the workers.

For example, say you have a cluster that includes a primary Tableau Server node and three worker nodes with gateway processes are running on the primary, Worker 2 and Worker 3. In this situation, you configure the primary Tableau Server for SSL, then copy the same SSL certificate and key files to Worker 2 and Worker 3. Because these files are in C:\Program Files\Tableau\Tableau Server\SSL folder on the primary, they are in that same location on Worker 2 and Worker 3.

You can configure a Tableau Server cluster to use SSL. If the primary Tableau Server computer is the only node that is running the gateway process (which it does by default), then that’s the only place where you need to configure SSL. See the procedure above for steps.

**Configure Internal SSL**

You can configure Tableau Server to use Secure Sockets Layer (SSL) for encrypted communications on all traffic between the Postgres repository and other server components. By default, SSL is disabled for communications between server components and the repository.
1. Open the Tableau Server Configuration Utility by selecting **Start > All Programs > Tableau Server 10.2 > Configure Tableau Server**.

2. In the Tableau Server Configuration dialog box, click the **SSL** tab.

3. Select one of the following options:

   - **Required for all connections**
     
     When this option is selected, Tableau Server uses SSL for communications between the repository database and other server components. In addition, direct connections to Tableau Server (connections using the "tableau" or "readonly" users) must use SSL.

   - **Optional for direct user connections**
     
     This option configures Tableau Server to use SSL between the repository and other server components and supports but does not require SSL for direct connections by "tableau" or "readonly" users.

   - **Off for all connections** (the default)
     
     This option disables SSL for internal communications and direct connections.

4. Click **OK**.

For more information on downloading the public certificate for direct connections, see *Configure SSL for Direct Connections*.

**Configure SSL for Direct Connections**

When Tableau Server is configured to use SSL internally, SSL connections are either optional or required for client machines making direct connections to the Tableau Server repository database. Direct connections include those using the "tableau" user or the "readonly" user.

To use SSL with direct connections, generate the SSL certificate file and copy it to the computer from which you will be making the direct connections.
1. Generate the SSL certificate file using the `regenerate_internal_tokens` command.

2. Locate the SSL certificate file by looking in the `workgroup.yml` file on the primary Tableau Server node.

   The `workgroup.yml` file is located on the primary Tableau Server node in the `\ProgramData\Tableau\Tableau Server\data\tabsvc\config` folder.

   The location of the SSL certificate and key files are listed in the file. For example:

   ```
   pgsq1.ssl.cert.file: C:/ProgramData/Tableau/Tableau Server/data/tabsvc/config/pgsql/server.crt
   pgsq1.ssl.key.file: C:/ProgramData/Tableau/Tableau Server/data/tabsvc/config/pgsql/server.key
   ```

3. Copy the certificate file to the computer that will be making the direct connection and import them into the computer’s certificate store using the documentation from the operating system manufacturer.

   **Note:** Do not copy the key file. This file should only be on the server.

**Configure Server-Wide SAML**

Configure server-wide SAML when you want users on Tableau Server to authenticate with a single SAML identity provider (IdP). For information about authenticating users with different IdPs for different sites on Tableau Server, see Configure Site-Specific SAML.

Before you configure Tableau Server for SAML, make sure you meet the SAML Requirements.

To configure Tableau Server to use server-wide SAML:

1. Place the certificate files in a folder named SAML, parallel to the Tableau Server 10.2 folder. For example:
C:\Program Files\Tableau\Tableau Server\SAML

You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

2. If you are configuring SAML during Tableau Server setup, go to the SAML tab in the configuration utility.

If you are configuring SAML after you installing Tableau Server, open the Tableau Server Configuration Utility (Start > All Programs > Tableau Server 10.2 > Configure Tableau Server) and then click the SAML tab.

3. On the SAML tab, select **SAML authentication for the server** and provide the location for each of the following:

   **Tableau Server return URL**—The URL that Tableau Server users will be accessing, such as http://tableau_server. Using http://localhost is not recommended. Using a URL with a trailing slash (for example, http://tableau_server/) is not supported.

   **SAML entity ID**—The entity ID uniquely identifies your Tableau Server installation to the IdP. You can enter your Tableau Server URL again here, if you like, but it does not have to be your Tableau Server URL.

   **SAML certificate file**—A PEM-encoded x509 certificate with the file extension .crt. This file is used by Tableau Server, not the IdP.

   **SAML certificate key file**—An RSA or DSA private key file that is not password protected, and that has the file extension .key. This file is used by Tableau Server, not the IdP.

4. Leave the **SAML IdP metadata file** text box empty for now and click Export Metadata File.

   A dialog box opens that allows you to save Tableau Server's SAML settings as an XML file. At this point, metadata from your IdP is not included.
5. Save the XML file with the name of your choice.

6. On your IdP’s website or in its application:

   - Add Tableau Server as a Service Provider. Refer to your IdP’s documentation for information about how to do this. As part of the process of configuring Tableau Server as a Service Provider, you will import the file you saved in step 5.
   - Confirm that your IdP uses **username** as the attribute element to verify.

7. Still within your IdP, export your IdP's metadata XML file.

   It’s a good idea to verify that the metadata XML you get from the IdP includes a **SingleSignOnService** element in which the binding is set to **HTTP-POST**, as in the following example:

   ```xml
   ```

8. Copy your IdP’s metadata XML file to the following folder on the computer where Tableau Server is installed:

   C:\Program Files\Tableau\Tableau Server\SAML

9. On the SAML tab in the Tableau Server Configuration dialog box, enter the location to the file in the **SAML IdP metadata file** text box:
10. Click **OK**. Tableau Server is now configured for SAML authentication.

Configure a Server Cluster for SAML

When you configure a Tableau Server cluster to use SAML, you place the same SAML certificate, SAML key, and SAML IdP metadata files on every computer that's running a Tableau application server process (also known as vizportal.exe). To configure a Tableau Server cluster to use SAML:

1. Configure the primary Tableau Server as described in the procedure above.

2. Place the same SAML certificate, SAML key, and SAML IdP metadata files that you used for the primary on each Tableau Worker that is running an application server process. Use the same folder location on the workers that you used on the primary. You do not need to do any additional configuration on the workers.
For example, consider a cluster that includes a primary Tableau Server and two workers. Application server processes are running on the primary and on Worker 2 and Worker 3. In this situation, you configure the primary Tableau Server for SAML, and then copy the same SAML certificate, SAML key, and SAML IdP metadata files to the Worker 2 and Worker 3 computers. On the worker computers, put the SAML files in the C:\Program Files\Tableau\Tableau Server\SAML folder, just as they are on the primary computer.

Test Your Configuration

Test your SAML configuration by opening a new web browser instance and typing the Tableau Server name in the URL window:

![Web browser window with Tableau Server URL](image)

You should note that the sign in prompt that appears is from your IdP and not Tableau Server:

![Sign in prompt](image)
Configure Kerberos

You can configure Tableau Server to use Kerberos. This allows you to provide a single sign-on (SSO) experience across all the applications in your organization. Before you configure Tableau Server for Kerberos make sure you meet the Kerberos Requirements.

**Note:** Kerberos constrained delegation for SSO to Tableau Server is not supported. (Constrained delegation for data sources is supported.) For more information, see Single-Sign On (SSO) in Kerberos Requirements.

1. Open a command prompt as an administrator and change directories to the location of Tableau Server’s bin directory. The default location is `C:\Program Files\Tableau\Tableau Server\10.2\bin`.

2. Type the following command to stop Tableau Server:

   ```
tabadmin stop
   ```

3. Open the Tableau Server Configuration Utility (Start > All Programs > Tableau Server 10.2 > Configure Tableau Server), and then click the Kerberos tab.

4. Select **Enable Kerberos for single sign-on.**

5. Click **Export Kerberos Configuration Script**. The generated script configures your Active Directory domain to use Kerberos with Tableau Server. For more information, see Kerberos Configuration Script.
Note: Verify the host names in the setspn lines of the script. If you are using an external load balancer or a reverse proxy, the host names should match the name you used when you configured Tableau Server for the load balancer or proxy. If you have not configured Tableau Server for your proxy or external load balancer, do that and then re-export the Kerberos configuration script to ensure it has the correct host names. See Add a Load Balancer and Configuring Proxies for Tableau Server.

6. Have your Active Directory domain administrator run the configuration script to create Service Principal Names (SPNs) and the .keytab file. The domain administrator should do the following:

   - Review the script to verify it contains correct values.
   - Run the script at a command prompt on any computer in the domain by typing the script name (not by double-clicking the script in Windows Explorer).

     The script creates a file, kerberos.keytab, in a keytabs folder in the location that the script was run.

7. Save a copy of the .keytab file created by the script to the Tableau Server computer. In Step 3, enter the path to the .keytab file, or click the browse button to navigate to the file. The keytab file will be copied to all the gateway nodes in your Tableau Server installation when you click OK in the Configuration utility.
**Note:** Do not rename the .keytab file. The script creates a file named `kerberos.keytab` and you need to save it with this name.

8. (optional) Click **Test Configuration** to confirm that your environment is configured correctly to use Kerberos with Tableau Server.

<table>
<thead>
<tr>
<th>Test: Configuration</th>
<th>Tests For:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* SPNs are correctly configured: OK</td>
</tr>
<tr>
<td></td>
<td>* Number of services configured for delegation: 0</td>
</tr>
</tbody>
</table>

If you have not configured any data sources for Kerberos delegation, 0 is shown for the **Number of services configured for delegation**.

9. Click **OK** to save your Kerberos configuration.

10. Start Tableau Server.

Confirm Your SSO Configuration

Once Tableau Server has restarted, test your Kerberos configuration from a web browser on a different computer by typing the Tableau Server name in the URL window:

You should be automatically authenticated to Tableau Server.
Configure SAP HANA SSO

You can configure Tableau Server to use SAML delegation to provide Single Sign-on (SSO) for SAP HANA. HANA SSO is not dependent on SAML authentication to Tableau Server. Note: You do not need to use SAML sign on with Tableau Server in order to use HANA SSO. You can sign in to Tableau Server using whatever method you choose.

With SSO for SAP HANA, Tableau Server functions as an Identity Provider (IdP) and this configuration allows you to provide a single sign-on experience for users making SAP HANA connections. As part of the configuration, you need to acquire a SAML certificate and key file for Tableau Server (these should be a public key certificate and private key). You need to also install the signed certificate in HANA. You can generate the certificate and key yourself, or get them from a Certificate Authority. For more information on generating a certificate/private key and configuring SAP HANA, see the Tableau Community.

Note: The SAP HANA driver version 1.00.9 or later must be installed on Tableau Server in order to use SSO for SAP HANA. The driver cannot encrypt the SAML assertion, so you may want to enable encryption for the SAML connections. For more information, see the Tableau Community.

Configure SSO for SAP HANA

To configure Tableau Server to use SSO for SAP HANA:

1. Place certificate files in a folder named SAML, parallel to the Tableau Server 10.2 folder. For example:

   C:\Program Files\Tableau\Tableau Server\SAML

   You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

2. After you install Tableau Server, run the Configuration utility (Start > All Programs
> Tableau Server 10.2 > Configure Tableau Server), and then click the SAP HANA tab.

3. Select **Use SAML to enable single sign-on for SAP HANA** and provide the location for each of the following:

   **SAML certificate file**—A PEM-encoded x509 certificate with the file extension `.crt` or `.cert`. This file is used by Tableau Server, and must also be installed on HANA.

   **SAML private key file**—A DER-encoded private key file that is not password protected, and that has the file extension `.der`. This file is only used by Tableau Server.

4. Select the format of the user name.

5. Select the case for the user name. This determines the case of the name when it is forwarded to the SAP HANA identity provider (IdP).
Configure Tableau Server for OpenID Connect

This topic describes how to configure Tableau Server to use OpenID Connect for single-sign on (SSO). This is one step in a multi-step process. The following topics provide information about configuring and using OpenID Connect with Tableau Server.

- OpenID Connect
- Configure the Identity Provider (IdP) for OpenID Connect
- Configure Tableau Server for OpenID Connect (you are here)
- Signing In to Tableau Server Using OpenID Connect
- Changing IdPs in Tableau Server for OpenID Connect

**Note:** Before you perform the steps described here, you must configure the OpenID identity provider (IdP) as described in Configure the Identity Provider (IdP) for OpenID Connect.

Important notes

Before you configure Tableau Server for OpenID Connect, make sure you read these notes.

- You can use OpenID Connect with Tableau Server only if the server is configured to use local authentication. OpenID Connect is not available if the server is configured to use Active Directory authentication. For more information, see Configure General Server Options.

- If you are configuring Tableau Server for the Salesforce IdP, then you must set the `vizportal.openid.client_authentication` parameter. See `tabadmin set options` for more information.

- We recommend that you configure Tableau Server to use SSL for external communications. This helps to maintain secure communications between Tableau Server
and the IdP during the exchange of authentication information. For details, see Configure External SSL.

If your IdP uses a self-signed certificate (or the IdP certificate is not signed by a trusted CA), then you can add the IdP public certificate to the Java truststore. See Configuring Tableau Server for OpenID Connect Using Uncommon or Self-Signed Certificates.

If you are configuring OpenID Connect during the initial configuration of Tableau Server (the first time the configuration utility runs), there is no option to set up SSL. In that case, we recommend that you finish the installation, then return to the configuration to set up SSL and then configure OpenID.

**Note** If you want to use external SSL for Tableau Server, it's generally more convenient to do that before you configure OpenID Connect. If you configure SSL after you've already configured OpenID, you need to return to the IdP and update the configuration that you made previously. For example, you need to change the protocol for the Tableau Server external URL from http:// to https://.

Configure the server

To configure Tableau Server for OpenID Connect, follow these steps.

1. Log in as an administrator to the computer where Tableau Server is running.

2. If the server is running, stop it (Windows Start > **All Applications** > **Tableau Server** > **Stop Tableau Server**).

   **Tip:** You can also stop the server by using the `tabadmin stop` command.

3. Run the Tableau Server Configuration tool (Windows Start > **All Applications** > **Tableau Server** > **Configure Tableau Server**).
4. Click the **OpenID** tab.

5. Select the **Use OpenID Connect for single sign-on** option.

6. Fill in the Provider client ID and Provider client secret boxes with the values you recorded earlier.

7. In the **Provider configuration URL** box, enter the URL that the IdP uses for OpenID Connect discovery.

   Alternatively, you can configure Tableau Server to reference a static discovery document to configure OpenID. The discovery file is a JSON document that defines the IdP configuration. Copy the file to the Tableau Server and then run the following sequence of `tabadmin` commands:

   ```
   tabadmin stop
   tabadmin set vizportal.openid.static_file <file-path>
   tabadmin configure
   tabadmin start
   ```

   Where `<file-path>` is the full path of the discovery file, for example, `c:\-files\openid-configuration`.

8. In the **Tableau Server external URL** box, enter the URL of your server. This is typically the public name of your server, such as `http://example.tableau.com`.

   When you initially configure OpenID, the Provider configuration URL box contains a default value that’s constructed based on the name of the server (gateway.public.host) and the gateway port, if any (gateway.public.port). In addition, by default the protocol is set to `https://` if SSL is enabled for the server.

   **Note:** Make sure that you update the external URL if the default value is not the URL for how your server can be reached from an external source.
9. Copy the URL in the box labeled **Configure the OpenID provider using the following redirect URL for Tableau Server.** You’ll use this value in the next procedure to finish configuring the IdP.

10. Start the server (Windows Start > **All Applications** > **Tableau Server** > **Start Tableau Server**).

    **Tip:** You can also start the server by using the `tabadmin start` command.

Add the redirect URL to the IdP configuration

After you configure Tableau Server, you finish the IdP configuration using the server’s redirect URL.

1. Return to the IdP portal where you set up the project or application.

2. Edit the project configuration and find the redirect URL.

3. Enter the redirect URL that you copied in the previous procedure.
Add an Administrator Account

The final step in activating Tableau Server is to add an administrator account. The administrator will have all access to the server including the ability to manage users, groups, and projects. Adding an administrator account differs depending on whether you are using Active Directory or local authentication.

Active Directory

If you are using Active Directory, type the **Username** and **Password** for an existing Active Directory user who will be the administrator. Then click **Add user**.

![Tableau Server Setup Tasks](image)

**Note:**

If the administrator account is in the same domain as the server simply type the username without the domain. Otherwise you should include the fully qualified domain name. For example, test.lan\username.

Local Authentication

If you are using Local Authentication, create an administrative account by typing a **Username**, **Display Name**, and a **Password** (twice) of your choosing. Then click **Add user**.
Automated Installation or Upgrade of Tableau Server

If you are responsible for deploying or managing Tableau Server, installation and upgrades are essential tasks. You can do these using the Setup program and following the prompts, but beginning with version 10.1 you can also take advantage of installation switches and options to install or upgrade Tableau Server without any intervention from you (no waiting for Setup program responses or Configuration utility prompts). And if you are knowledgeable about scripting or programming you can automate the install or upgrade process so it is done in a controlled and reproducible way, whether your installation is a single node or a distributed, multi-node environment.

Prerequisites for an automated install or upgrade of Tableau Server

To install Tableau Server without any input from you, you need the following:
• The Tableau Server install program (and the Tableau Server Worker install program if you have a multi-node environment), version 10.1.

• A valid product key.

• Registration information in JSON format.

  For details, see Registration Input File Options.

• User name/password for the initial administrator user.

• (Optional: If no configuration file is included, Tableau Server is installed with all defaults, including the default Windows NT AUTHORITY\NETWORK SERVICE user for the Run As User)
  
  • Run As User information.

  • Configuration file with any non-default configuration values.

  For details, see Automated Installation Configuration Options.

• A script or program to do the installation (you can use the sample Python script on GitHub, or write your own)

Best practices for an automated install

To automate the installation of Tableau Server with non-default configuration, you can provide a YAML file with configuration options. Details of the configuration options are listed in Automated Installation Configuration Options, and you can find sample configuration files on GitHub. When using a configuration file to specify non-default values, you should consider using one or more of these best practices:

• Install Tableau Server interactively, with the same configuration as your new server will have, then use the resulting `tabsvc.yml` configuration file as a starting point for the file you use during an automated install. By default the configuration file is created in `C:\ProgramData\Tableau\Tableau Server\config`. Changes you need to make include IP addresses and host names for the nodes.
Note: If you create a `tabsvc.yml` file you need to add the `config.version` value (15 for version 10.1) as the first line of the file:

```yaml
config.version: 15
```

If you use an existing `tabsvc.yml` file that already has a `config.version` value, you do not need to manually update it.

- Use one of the sample configuration files from GitHub as a starting point for your file: a single-node sample configuration file and a multi-node sample configuration file.

When performing an upgrade, the existing configuration file is used, so you do not need to specify non-default configuration values, except for the Run As User username and password (if you are not using the default). We recommend you do using a "secrets" file instead of in the configuration file. For more information, see Server Run As User.

### Install Switches for Tableau Server

You can use these switches when installing or upgrading Tableau Server:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>/SILENT</td>
<td>Install/Upgrade: Run Setup in unattended, feedback mode. Dialog boxes and UI are displayed but you cannot interact with them.</td>
<td>Server does not start automatically when installed in silent mode. To start Tableau Server, use <code>tabadmin start</code>. Note: Use either <code>/SILENT</code> or <code>/VERYSILENT</code>, not both.</td>
</tr>
<tr>
<td>/VERYSILENT</td>
<td>Install/Upgrade: Run Setup in unattended, fully silent mode. No dialog boxes or UI are displayed.</td>
<td>Server does not start automatically when installed in silent mode. To start Tableau Server, use <code>tabadmin start</code>.</td>
</tr>
<tr>
<td>Switch</td>
<td>Description</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>/SUPPRESSMSGBOXE-S</td>
<td>Install/Upgrade: Run Setup with any operating system message boxes suppressed. The default action for the suppressed message box is taken.</td>
<td>Any errors related the operating system would normally display are hidden. For example, if an install switch is mis-typed, the error would not display.</td>
</tr>
<tr>
<td>/CUSTOMCONFIG</td>
<td>Install/Upgrade: Specify the location of a custom configuration file.</td>
<td>If the switch is not used, Tableau Server is installed with defaults. See Automated Installation Configuration Options for more information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Example:</strong> <code>&lt;Setup file&gt; /SILENT /ACCEPTEULA /CUSTOMCONFIG=G=&quot;path\filename&quot;</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> If used during an upgrade, non-default values are merged with existing configuration values. As a best practice, upgrade in a separate step, before changing the configuration. This helps if you need to</td>
</tr>
<tr>
<td>Switch</td>
<td>Description</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>/LOG</td>
<td>Install/Upgrade: Specify the location of the install log file.</td>
<td>If no file location is specified, the log file is written to the user's TEMP folder. The log file is overwritten on each install. Check this log file for errors after installation.</td>
</tr>
<tr>
<td>/FASTUNINSTALL</td>
<td>Upgrade: Upgrade without making a full backup of Tableau Server data.</td>
<td>Uninstalls the existing version without creating a full backup, then installs the new version. This is the equivalent of selecting <strong>Without full backup</strong> when upgrading interactively. See Tableau Server Upgrade Backup Options for details.</td>
</tr>
<tr>
<td>/UNINSTALLONLY</td>
<td>Uninstall: Uninstall Tableau Server without then installing the new version.</td>
<td>Uninstalls the existing version. Does not install the new version.</td>
</tr>
<tr>
<td>/DIR</td>
<td>Install/Upgrade: Specify a non-default install location.</td>
<td>Specifies the location to install server. If not used, Tableau Server is installed to C:\Program Files\Tableau\Tableau Server-&lt;version&gt;</td>
</tr>
</tbody>
</table>

**Example:** `<Setup file> /SILENT /ACCEPTEULA /LOG-G=path\filename`
<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>/VERYSILENT</td>
<td>Accept the End User License Agreement (EULA). This switch is required for silent install on both primary and worker nodes.</td>
<td>Required. If not included when using /SILENT or /VERYSILENT, Setup fails silently.</td>
</tr>
</tbody>
</table>
| /ACCEPTEULA    | Install/Upgrade: On the worker nodes, specify the IP address of the primary node. This switch is used only on worker nodes and is required when installing worker nodes. | Required on worker nodes. Provides the worker node with the IP address of the primary node during installation. Example: <Setup file> /VERYSILENT /ACCEPTEULA /PRIMARYIP="172.1.1.1"

**Workflow for a new, automated installation**

When scripting a Tableau Server install to a new computer or computers, these are the steps you'll follow:
1. (Distributed installations only) Run the Worker Software Setup program on each worker node using the /VERYSILENT, /ACCEPTEULA, and /PRIMARYIP switches to specify the IP address or host name of the primary node.

2. Run the primary Tableau Server Setup program with the /SILENT or /VERYSILENT switch, and the /ACCEPTEULA switch, along with any other switches you want to use.

3. Activate the license using tabadmin (tabadmin activate).

4. Register server (tabadmin register).

5. Start Tableau Server (tabadmin start).

6. Create the initial administrative user (tabcmd initialuser).

Workflow for an automated upgrade

When scripting a Tableau Server upgrade, these are the steps you'll follow:

1. Run the primary Tableau Server Setup program with the /SILENT or /VERYSILENT switch, and the /ACCEPTEULA switch, along with any other switches you want to use.

**Note:** You can automate an upgrade to version 10.2 if you are upgrading version 9.0.x or higher on a single-node installation, or version 9.3.x or higher if you are upgrading a multi-node installation. If you are upgrading other versions of Tableau Server, you need to uninstall Tableau Server from the primary machine and all worker nodes, then follow the steps for a multi-node installation.

2. Start Tableau Server (tabadmin start).
Automated Installation Configuration Options

When you install or upgrade Tableau Server interactively by running the Setup program, the Configuration utility runs as part of the process, and you have the opportunity to configure Tableau Server. When you do an automated install or upgrade, you can include a custom configuration file with any non-default configuration values you want set. If you don't specify a custom configuration file while doing an automated installation of Tableau Server, the server is installed with defaults. If you do use a custom configuration file to set some non-default values, you do not need to include any settings that use defaults.

The tables below list configuration options, organized by Tableau Server Configuration utility tab:

A best practice for creating a configuration file for automated Tableau Server installation is to use an existing configuration file as a starting point and modify it for your new installation. For more information, see Best practices for an automated install.

General tab

Server Run As User

**Important:** For security purposes, we recommend that you do not include the Run As User credentials in a custom configuration file. You can put these separately in a "secrets" file that is secured elsewhere. You can see an example of how to do this in the sample [ScriptedInstaller python script](https://github.com) on GitHub.

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>service.runas.username</code></td>
<td><code>NT AUTHORITY\NetworkService</code></td>
<td>The Windows account that Tableau Server</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>service.runas.password</td>
<td>&lt;not applicable&gt;</td>
<td>uses when it accesses resources.</td>
</tr>
</tbody>
</table>

More information:

- For detailed information on Run As User, see Run As User.
- For information about the Run As User option on the General tab, see Server Run As User.

User Authentication

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserver.authenticate</td>
<td>local</td>
<td>Specify the type of user authentication to be used:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- local will use the user-management built in to Tableau Server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- activedirectory will use Active Directory to authenticate users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For more information, see Authentication.</td>
</tr>
</tbody>
</table>

Example:

```
wgserver.authenticate: activedirectory
```

More information:

- For detailed information on authorization, see Authentication.
- For information about the user authentication option on the General tab, see User Authentication.
Active Directory

For more information, see User Authentication.

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserver.domain.fqdn</td>
<td>&lt;not applicable&gt;</td>
<td>Specify the fully qualified domain name for Active Directory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wgserver.domain.fqdn: myco.lan</td>
</tr>
<tr>
<td>wgserver.domain.nickname</td>
<td>&lt;not applicable&gt;</td>
<td>Specify the NetBIOS name for Active Directory.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wgserver.domain.nickname: MYCO</td>
</tr>
<tr>
<td>wgserver.sspi.ntlm</td>
<td>false</td>
<td>Specify whether server should use Microsoft SSPI to automatically sign users in based on their Windows username and password.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wgserver.sspi.ntlm: true</td>
</tr>
</tbody>
</table>

More information:

- For detailed information on Active Directory, see User Management in Active Directory Deployments.
- For information about the Active Directory options on the General tab, see User Authentication.
Gateway

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>worker.gateway.port</td>
<td>80</td>
<td>Port number for the gateway process.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker.gateway.port: 8080</td>
</tr>
<tr>
<td>install.firewall.gatewayhold</td>
<td>true</td>
<td>Specifies whether Tableau Server should open the port specified by worker.gateway.port in the Windows firewall. This allows HTTP access to the server by other computers on your network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>install.firewall.gatewayhold: false</td>
</tr>
</tbody>
</table>

More information:

- For information about the Gateway option on the General tab, see Gateway.

Sample data and users

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>install.component.samples</td>
<td>true</td>
<td>Installs Tableau Samples.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> This option must be selected during initial install. You cannot go back and add samples after Tableau</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Server is installed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td>install.component.samples: false</td>
</tr>
</tbody>
</table>

More information:

- For information about the Sample data option on the General tab, see Sample data.

### Server Crash Reporter

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>servercrashupload.enable</td>
<td>false</td>
<td>Specifies whether crash report uploading is enabled.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td>servercrashupload.enable: true</td>
</tr>
<tr>
<td>servercrashupload.scheduled_time</td>
<td>01:00:00 AM</td>
<td>Scheduled time for upload of crash logs, in UTC (HH:MM:SS AM/PM).</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td>servercrashupload.scheduled_time: 03:00:00 AM</td>
</tr>
</tbody>
</table>

More information:
- For information about the Crash Reporter option on the General tab, see Server Crash Reporter.

Data Connections tab

Caching

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vizqlserver.data_refresh</td>
<td>&lt;empty&gt;</td>
<td>• &lt;empty&gt; = refresh less often. Cache and reuse data for as long as possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• &lt;n&gt; = balanced. &lt;n&gt; is the maximum number of minutes of caching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 0 = refresh more often, with the cache being refreshed with each page reload.</td>
</tr>
</tbody>
</table>

Example:

vizqlserver.data_refresh: 20

Initial SQL

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vizqlserver.initialsql.disabled</td>
<td>false</td>
<td>Specify whether to ignore initial SQL statements for all data sources.</td>
</tr>
</tbody>
</table>

Example:

vizqlserver.initialsql.disabled: true
More information:

- For more information about options on the Data Connections tab, see Configure Data Connections.

Servers tab

**Important:** You must be consistent with the way you reference a particular node. For example, if you specify the primary node by machine name in `worker.hosts` you need to use the machine name for every configuration value that references the primary node. If you use an IP address to specify a worker node, you need to continue use the IP address for every instance of the worker node.

Worker 0 (primary)

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>worker0.vizqlserver.procs</code></td>
<td>Number of cores / 4, up to a maximum of 4 n/4</td>
<td>Number of instances of VizQL Server installed on the node. Example: <code>worker0.vizqlserver.procs: 4</code></td>
</tr>
<tr>
<td><code>worker0.vizportal.procs</code></td>
<td>1</td>
<td>Number of instances of Application Server installed on the node. Example: <code>worker0.vizportal.procs: 1</code></td>
</tr>
<tr>
<td><code>worker0.backgrounder.procs</code></td>
<td>2 unless there are</td>
<td>Number of instances of Backgrounder installed on the node.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>work0.backgrounder.procs</td>
<td>fewer than 8 cores, in which case default is 1 instance.</td>
<td>Example: worker0.backgrounder.procs: 2</td>
</tr>
<tr>
<td>work0.cacheserver.procs</td>
<td>2 unless there are fewer than 8 cores, in which case default is 1 instance.</td>
<td>Number of instances of cache server installed on the node. Example: worker0.cacheserver.procs: 2</td>
</tr>
<tr>
<td>worker0.dataserver.procs</td>
<td>2 unless there are fewer than 8 cores, in which case default is 1 instance.</td>
<td>Number of instances of data server installed on the node. Example: worker0.dataserver.procs: 2</td>
</tr>
<tr>
<td>worker0.dataengine.procs</td>
<td>1</td>
<td>Number of instances of data engine installed on the node.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>worker0.dataengine.procs</td>
<td>1</td>
<td>Example: worker0.dataengine.procs: 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> If &gt; 0, file store should also be installed (see below).</td>
</tr>
<tr>
<td>worker0.filestore.enabled</td>
<td>true</td>
<td>Specifies whether the file store is on the node. File store is only installed when data engine is installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: worker0.filestore.enabled: true</td>
</tr>
<tr>
<td>worker0.searchserver.procs</td>
<td>1</td>
<td>Specifies whether the Search &amp; Browse process is installed on the node. By default Search &amp; Browse is installed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: worker0.searchserver.enabled: 0</td>
</tr>
<tr>
<td>worker0.gateway.enabled</td>
<td>true</td>
<td>Specifies whether the gateway service is installed on the node.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: worker0.gateway.enabled: true</td>
</tr>
</tbody>
</table>
Worker 1 - n (workers)

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>worker.hosts</td>
<td>&lt;not applicable&gt;</td>
<td>Machine name or IP address of the primary node and any worker nodes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker.hosts: tabserver, 10.32.139.21, 10.32.139.6</td>
</tr>
<tr>
<td>worker&lt;n&gt;.vizqlserver.procs</td>
<td>Number of cores / 4, up to a maximum of 4. n/4</td>
<td>Number of instances of VizQL Server installed on the node.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker1.vizqlserver.procs: 2</td>
</tr>
<tr>
<td>worker&lt;n&gt;.vizportal.procs</td>
<td>1</td>
<td>Number of instances of Application Server installed on the node.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker1.vizportal.procs: 1</td>
</tr>
<tr>
<td>worker&lt;n&gt;.backgrounder.procs</td>
<td>2 unless there are fewer than 8 cores, in which case default is 1</td>
<td>Number of instances of Backgrounder installed on the node.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker2.backgrounder.procs: 2</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>instance.</td>
<td></td>
</tr>
<tr>
<td>worker&lt;n&gt;.cacheserver.procs</td>
<td>2 unless there are fewer than 8 cores, in which case default is 1 instance.</td>
<td>Number of instances of cache server installed on the node. Example: worker1.cacheserver.procs: 1</td>
</tr>
<tr>
<td>worker&lt;n&gt;.dataserver.procs</td>
<td>2 unless there are fewer than 8 cores, in which case default is 1 instance.</td>
<td>Number of instances of data server installed on the node. Example: worker1.dataserver.procs: 1</td>
</tr>
<tr>
<td>worker&lt;n&gt;.dataengine.procs</td>
<td>1</td>
<td>Number of instances of data engine installed on the node. Note: If &gt; 0, file store should also be installed (see below). Example: worker1.dataengine.procs: 0</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>work-er&lt;n&gt;.filestore.enabled</td>
<td>true (when data engine is also installed)</td>
<td>Specifies whether the file store is on the node. File store is only installed when data engine is installed. Example: work-er1.filestore.enabled: false</td>
</tr>
<tr>
<td>work-er&lt;n&gt;.searchserver.procs</td>
<td>1</td>
<td>Specifies whether the Search &amp; Browse process is installed on the node. By default Search &amp; Browse is installed. Example: work-er1.searchserver.procs: 0</td>
</tr>
<tr>
<td>worker&lt;n&gt;.gateway.enabled</td>
<td>true</td>
<td>Specifies whether the gateway service is installed on the node. Example: worker2.gateway.enabled: false</td>
</tr>
</tbody>
</table>

More information:

- For more information about options on the Servers tab, see Servers.
### Repository

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>pgsql0.host</code></td>
<td>&lt;not applicable&gt;</td>
<td>Machine name or IP address of the node on which the repository is installed. Example: <code>pgsql0.host: tabserver</code></td>
</tr>
<tr>
<td><code>pgsql1.host</code></td>
<td>&lt;not applicable&gt;</td>
<td>Machine name or IP address of the node if the repository installed on a second node. Example: <code>pgsql1.host: 10.32.139.6</code></td>
</tr>
<tr>
<td><code>pgsql.preferred_host</code></td>
<td>&lt;not applicable&gt;</td>
<td>Machine name or IP address of the node with the preferred repository installed, if specified. This is only applicable if the cluster includes two instances of the repository. Example: <code>pgsql.preferred_host: 10.32.139.6</code></td>
</tr>
</tbody>
</table>

**More information:**

- For more information about options on the Repository, see Tableau Server Repository.
SMTP tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>svc-monitor.notification.smtp.server</code></td>
<td>&lt;not applicable&gt;</td>
<td>Address of SMTP server.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.server:</code></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td><code>mail.example.com</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.send_account</code></td>
<td>&lt;not applicable&gt;</td>
<td>User name for SMTP account.</td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.port</code></td>
<td>25</td>
<td>Port number for SMTP server.</td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.password</code></td>
<td>&lt;not applicable&gt;</td>
<td>Password for SMTP server account.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.password:</code></td>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td><code>password</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>svc-monitor.notification.smtp.ssl_enabled</code></td>
<td>false</td>
<td>Specifies whether the connection to the SMTP server is encrypted.</td>
</tr>
<tr>
<td><strong>Note:</strong> This should be left as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>false. Encrypted SMTP connections are not supported for alerts or subscriptions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>svc-mon-itor.notification.smtp.from_address</code></td>
<td>&lt;not applicable&gt;</td>
<td>Email address that sends alerts. If email alerts are enabled, this needs to be in a valid email address format but does not need to be a valid address on Tableau Server. Example: <code>svc-mon-itor.notification.smtp.from_address: donot-reply@example.com</code></td>
</tr>
<tr>
<td><code>svc-mon-itor.notification.smtp.target_addresses</code></td>
<td>&lt;not applicable&gt;</td>
<td>Email address to receive alerts. If email alerts are enabled, you need to include at least one address. Separate multiple addresses with commas. Example: <code>svc-mon-itor.notification.smtp.target_addresses: iluvdata@example.com</code></td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>

More information:

- For more information about options on the SMTP Setup tab, see Configure SMTP Setup.

Alerts and Subscriptions tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>subscriptions.enabled</td>
<td>false</td>
<td>Specifies if users can receive email for subscriptions to view. Example: subscriptions.enabled: true</td>
</tr>
<tr>
<td>svc-monitor</td>
<td>false</td>
<td>Specifies whether email alerts are sent for server health events (components</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>editor.notification.smtp.enabled</td>
<td></td>
<td>going up or down, failover occurring). Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>svc-monitoritor.notification.smtp.enabled: true</td>
</tr>
</tbody>
</table>

### Disk Space Monitoring

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>storage.monitoring.record_history_enabled</td>
<td>true</td>
<td>Specifies whether disk space usage should be saved in the repository.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: storage.monitoring.record_history_enabled: false</td>
</tr>
<tr>
<td>storage.monitoring.email_enabled</td>
<td>false</td>
<td>Specifies whether email alerts will be sent if thresholds are crossed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: storage.monitoring.email_enabled: true</td>
</tr>
<tr>
<td>storage.monitoring.warning_percent</td>
<td>20</td>
<td>Warning threshold as a percentage of unused disk space.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage.monitoring.warning_percent: 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage_monitoring.critical_percent: 10</td>
<td></td>
<td>Critical threshold as a percentage of unused disk space.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage.monitoring.critical_percent: 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage.monitoring.email_interval_min: 60</td>
<td></td>
<td>Interval in minutes of disk space email alerts.</td>
</tr>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>storage.monitoring.email_interval_min: 45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More information:

- For more information about options on the Alerts and Subscriptions tab, see Configure Server Alerts.

SSL tab

SSL requires that the SSL certificate and key pair be installed in an SSL folder parallel to the \<version> folder where Tableau Server is installed. For example, C:\Program Files\Tableau\Tableau Server\SSL.
## External Webserver SSL

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssl.enabled</td>
<td>false</td>
<td>Specifies whether SSL is enabled for connections between clients and Tableau Server.</td>
</tr>
<tr>
<td>ssl.cert.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to the certificate file (.crt).</td>
</tr>
<tr>
<td>ssl.key.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to the key file (.key).</td>
</tr>
<tr>
<td>ssl.chain.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to the certificate chain file (optional).</td>
</tr>
<tr>
<td>ssl.client_certificate_login_required</td>
<td>false</td>
<td>Specifies whether mutual SSL and automatic login should be used. Only valid if ssl.enabled is set to true.</td>
</tr>
<tr>
<td>ssl.cacert.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to CA certificate file (.crt).</td>
</tr>
</tbody>
</table>

**More information:**

- For more information about options for configuring External SSL, see Configure External SSL.

## Internal Repository Database SSL

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pgsql.ssl.enabled</td>
<td>false</td>
<td>Specifies whether SSL is enabled for connections to the repository.</td>
</tr>
</tbody>
</table>
| pgsql.ssl.required         | false         | • Required for all connections: if true and pgsql.ssl.enable = true  
                          • Optional for client connection: if                                                                                                         |


<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>false and pgsql.ssl.enable = true</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Off for all connections: if false and pgsql.ssl.enable = false</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More information:

- For more information about options for configuring Internal SSL, see Configure Internal SSL.

SAML tab

SAML requires that the SAML XML and certificate and key pair be installed in an \SAML folder parallel to the \<version> folder where Tableau Server is installed. For example, C:\Program Files\Tableau\Tableau Server\SAML.

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserv-er.authentication.login</td>
<td>&lt;not applicable&gt;</td>
<td>Specifies whether SAML is enabled. Example: wgserv-er.authentication.login: saml</td>
</tr>
<tr>
<td>wgserver.saml.returnurl</td>
<td>&lt;not applicable&gt;</td>
<td>The URL that Tableau Server users will access.</td>
</tr>
<tr>
<td>wgserver.saml.entityid</td>
<td>&lt;not applicable&gt;</td>
<td>The entity ID that identifies the Tableau Server installation to the IdP.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>wgserver.saml.cert.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to SAML certificate file (.crt).</td>
</tr>
<tr>
<td>wgserver.saml.key.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to SAML key file (.key).</td>
</tr>
<tr>
<td>wgserver.saml.idpmetadata.file</td>
<td>&lt;not applicable&gt;</td>
<td>Fully-qualified path to SAML XML metadata file (.xml).</td>
</tr>
<tr>
<td>wgserver.saml.protocol</td>
<td>http (if SAML is enabled)</td>
<td>The protocol used by SAML. Required if SAML is enabled.</td>
</tr>
<tr>
<td>wgserver.saml.domain</td>
<td>localhost (if SAML is enabled)</td>
<td>The SAML domain. Required if SAML is enabled.</td>
</tr>
<tr>
<td>wgserver.saml.port</td>
<td>80 (if SAML is enabled)</td>
<td></td>
</tr>
</tbody>
</table>

**More information:**

- For more information about options on the SAML tab, see Configure Server-Wide SAML.
- For more information about SAML and Tableau Server, see SAML.

**Kerberos tab**

To use Kerberos, you need to generate .keytab file by running the configuration script and publish that file.
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserver.kerberos.enabled</td>
<td>false</td>
<td>Specifies whether Kerberos is enabled.</td>
</tr>
</tbody>
</table>

More information:

- For more information about options on the Kerberos tab, see Configure Kerberos.
- For more information about Kerberos and Tableau Server, see Kerberos.

**SAP HANA tab**

Requires external configuration in addition to setting configuration values.

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserver.sap_hana_sso.enabled</td>
<td>false</td>
<td>Specifies whether SAP HANA is enabled.</td>
</tr>
<tr>
<td>wgserver.sap_hana_sso.username.format</td>
<td>username</td>
<td>Specifies how Tableau Server will use for the SAP HANA username:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wgserver.sap_hana_sso.username.case</td>
<td>preserve</td>
<td>Specifies how to handle the case of the username. By default the username is left unchanged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More information:
For more information about options on the SAP HANA tab, see Configure SAP HANA SSO.

OpenID Connect tab

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserv-server.authentication.login</td>
<td>&lt;not applicable&gt;</td>
<td>Specifies whether OpenID is enabled.</td>
</tr>
<tr>
<td>vizportal.openid.client_id</td>
<td>&lt;not applicable&gt;</td>
<td></td>
</tr>
<tr>
<td>vizportal.openid.client_secret</td>
<td>&lt;not applicable&gt;</td>
<td></td>
</tr>
<tr>
<td>vizportal.openid.config_url</td>
<td>&lt;not applicable&gt;</td>
<td>URL the IdP uses for OpenID Connect discovery.</td>
</tr>
</tbody>
</table>

More information:

- For more information about options on the OpenID Connect tab, see Configure Tableau Server for OpenID Connect.
- For more information on additional settings that are not exposed in the Configuration utility, see tabadmin set options.
Registration Input File Options

If you register Tableau Server from the command line using the tabadmin register command, you need to supply a JSON-format input file with the registration information you would have entered manually when registering interactively in the Setup program. The most common circumstance for doing this is when you automate the installation of Tableau Server using a script or program.

You can use the example registration file on GitHub or create your own, using all the fields in the table below, in any order, with the field name and its value on a single line, in double quotes, and separated by a colon. For example:

"city" : "Seattle"

<table>
<thead>
<tr>
<th>Field name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>first_name</td>
<td>&lt;your first name&gt;</td>
</tr>
<tr>
<td>last_name</td>
<td>&lt;your last name&gt;</td>
</tr>
<tr>
<td>company</td>
<td>&lt;your company or organization&gt;</td>
</tr>
<tr>
<td>email</td>
<td>&lt;your email address&gt;</td>
</tr>
<tr>
<td>phone</td>
<td>&lt;your phone number&gt;</td>
</tr>
<tr>
<td>city</td>
<td>&lt;your city&gt;</td>
</tr>
<tr>
<td>state</td>
<td>&lt;your state&gt;</td>
</tr>
<tr>
<td>country</td>
<td>&lt;your country&gt;</td>
</tr>
<tr>
<td>zip</td>
<td>&lt;your zip or postal code&gt;</td>
</tr>
<tr>
<td>title</td>
<td>&lt;your job title&gt;</td>
</tr>
<tr>
<td>department</td>
<td>&lt;your department from the following list&gt;:</td>
</tr>
<tr>
<td></td>
<td>• Accounting/Finance</td>
</tr>
<tr>
<td>Field name</td>
<td>Value</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
</tr>
</tbody>
</table>
|            | • Engineering/Development  
|            | • General Mgmt/Administration  
|            | • Human Resources  
|            | • Legal  
|            | • Marketing  
|            | • Operations  
|            | • Channel  
|            | • Product Management  
|            | • Purchasing/Merchandising  
|            | • Sales  
|            | • Science  
|            | • Support/Service  
|            | • Other |

**industry**

**<your industry from the following list>:**

- Aerospace & Defense
- Agriculture & Mining
- Associations & Non-profits
- Automotive
- Banking & Finance
- Business Services
- Construction
- Consumer Goods & Services
- Education
- Energy & Utilities
- Food & Beverage
- Government
- Hardware
- Healthcare & Medical
- Hospitality & Travel
<table>
<thead>
<tr>
<th>Field name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Insurance</td>
</tr>
<tr>
<td></td>
<td>• Investment Services</td>
</tr>
<tr>
<td></td>
<td>• Manufacturing</td>
</tr>
<tr>
<td></td>
<td>• Media, Entertainment &amp; Publishing</td>
</tr>
<tr>
<td></td>
<td>• Pharmaceuticals &amp; Biotech</td>
</tr>
<tr>
<td></td>
<td>• Retail &amp; Distribution</td>
</tr>
<tr>
<td></td>
<td>• Software &amp; Technology</td>
</tr>
<tr>
<td></td>
<td>• Telecommunications</td>
</tr>
<tr>
<td></td>
<td>• Transportation &amp; Logistics</td>
</tr>
<tr>
<td></td>
<td>• Other</td>
</tr>
</tbody>
</table>

**Reconfigure the Server**

When you install Tableau Server for the first time, you do initial configuration of the server as part of the installation. You can run the Tableau Server Configuration utility after installing Tableau Server to make additional configuration changes. Some configuration options are only available when you run the configuration utility after installation. You can also use the tabadmin command line tool to make configuration changes. Configuration setting changes are written to the `tabsvc.yml` file located in the `<install drive>:\ProgramData\Tableau\Tableau Server\config` directory.

**Note:** You cannot switch between Active Directory and Local Authentication. These options can only be configured during the initial installation of Tableau Server.

To change a Tableau Server configuration setting:
1. Stop the server by selecting All Programs > Tableau Server 10.2 > Stop Tableau Server on the Windows Start menu.

2. Select Configure Tableau Server on the Windows Start menu.

3. If you are using an Active Directory account for the server’s Run As User account, enter its password on the General tab.

4. Make your configuration change.

5. Click OK.

6. Start the server by selecting All Programs > Tableau Server 10.2 > Start Tableau Server on the Windows Start menu.

Reconfigure Processes

To change how processes are configured for a single server installation, follow the steps below. If you are changing how processes are configured for a worker, refer to Install and Configure Worker Nodes.

1. You will need to stop Tableau Server to make this configuration change. From the Start menu, click All Programs > Tableau Server 10.2 > Stop Tableau Server.

2. Open the Tableau Server Configuration dialog box from the Start menu by navigating to All Programs > Tableau Server 10.2 > Configure Tableau Server.

3. Enter your Password, if necessary, on the General tab then click the Servers tab:
4. Highlight This Computer and click **Edit**:

5. The Edit Tableau Server dialog box is where you change the number of processes:

<table>
<thead>
<tr>
<th>Computer</th>
<th>VoQL Server</th>
<th>Application Server</th>
<th>Background</th>
<th>Cache Server</th>
<th>Data Server</th>
<th>Data Engine</th>
<th>File Store</th>
<th>Repository</th>
<th>Gateway</th>
<th>Search &amp; Browse</th>
<th>Base Install</th>
</tr>
</thead>
<tbody>
<tr>
<td>This Computer (Primary)</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
You can run up to eight instances of the VizQL, application server, data server, or background processes—although this limit can be changed if necessary. See Server Process Limits for more information. You need to have at least one instance of backgrounder installed. Also, for Tableau Server to function, there must always be one active instance of the data engine (and associated file store) and the repository. For steps on how to move them to another machine, see Move the Data Engine and File Store Processes. For steps on how to configure additional instances of them, refer to High Availability.

After you make your changes, click OK.

6. If you want to designate a specific computer as the preferred active repository, select the computer from the Select host list. If you add workers, you need to save the configuration and restart the Configuration utility for the workers to display in the list. For more information about the repository, see Tableau Server Repository.

7. Click OK to close the Configuration utility.

8. Start Tableau Server again. From the Start menu, click All Programs > Tableau Server 10.2 > Start Tableau Server.

Tableau Server Processes

Tableau Server installs a number of processes that work together to deliver the features that make up Tableau Server.

In this topic

- Configuring processes
- Licensed processes
- List of processes

Configuring processes

Certain processes listed below cannot be configured: cluster controller and coordination service are installed on every node as part of the base install. They are required on every server node and do not count against a core-based license. File store is installed when you install
data engine and cannot be installed separately. Every instance of a data engine process will always have one instance of the file store process present as well.

The topics Performance Tuning Examples and High Availability describe some of the approaches you can take when configuring processes. High-level status for each process is displayed on the server’s Status page and more detailed information related to some of the processes—such as the background process—is in the Administrative Views topic.

Licensed processes

Some of the processes that are installed as a part of Tableau Server are \"licensed\" processes. Licensed processes need a valid Tableau Server license in order to run. Other processes that are installed as a part of Tableau Server are not tied to a valid license. This has the following impact:

- Every licensed process needs to regularly contact the Tableau Server License Manager service that runs on the primary Tableau Server computer to verify they are licensed. If they cannot confirm there is a valid license, for example, if the primary node is not available, the process will not run and Tableau Server may not function properly or reliably.

- If you have a core-based Tableau Server license, the cores on any node with a licensed processes will count against the total count of licensed cores.

The "Licensed" column in the table below identifies those processes that require a valid license, and which impact the count of cores in core-based licenses.

List of processes

For information on log files generated by these processes, see Server Log File Locations.

<table>
<thead>
<tr>
<th>Process</th>
<th>Purpose</th>
<th>Multi-Threaded</th>
<th>Performance Characteristics</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server</td>
<td>Handles</td>
<td>Yes</td>
<td>Only consumes noticeable resources</td>
<td>Yes</td>
</tr>
<tr>
<td>vizportal.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Backgrounder</td>
<td>the web application, REST API-calls, supports browsing and searching</td>
<td>No</td>
<td>during infrequent operations, like publishing a workbook with an extract, or generating a static image for a view. Its load can be created by browser-based interaction and by tabcmd.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A single-threaded process where multiple processes can be run on any or all machines in the cluster to expand capacity. The backgrounder normally doesn't consume much process memory, but it can consume CPU, I/O, or network resources based on the nature of the workload presented to it. For example, performing large extract refreshes can use network bandwidth to retrieve data. CPU resources can be consumed by data retrieval or complex tabcmd tasks.</td>
<td></td>
</tr>
<tr>
<td>Cache Server</td>
<td>Query cache</td>
<td>No</td>
<td>A query cache distributed and shared across the server cluster. This in-memory cache speeds user experience across many scenarios. VizQL server, backgrounder, and data server (and API server and applic-</td>
<td>No</td>
</tr>
<tr>
<td>redis-server.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Cluster Controller</td>
<td>Responsible for monitoring various components, detecting failures, and executing failover when needed</td>
<td>n/a</td>
<td>Included in the base install on every node.</td>
<td>No</td>
</tr>
<tr>
<td>cluster-controller.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination Service</td>
<td>In distributed installations, responsible for ensuring there is a quorum for making decisions</td>
<td>n/a</td>
<td>Always installed on the primary node. For server installations with three to five nodes, also installed on the first two worker nodes. For server installations of more than five nodes, also installed on the first four worker nodes.</td>
<td>No</td>
</tr>
<tr>
<td>zookeeper.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Data Engine</td>
<td>during fail-over</td>
<td></td>
<td>The data engine’s workload is generated by requests from the VizQL server, application server, API server, data server, and backgrounder server processes. The data engine services requests from most of the other server processes as well. It is the component that loads extracts into memory and performs queries against them. Memory consumption is primarily based on the size of the data extracts being loaded. The data engine is multi-threaded to handle multiple requests at a time. Under high load it can consume CPU, I/O, and network resources, all of which can be a performance bottleneck under load. At high load, a single instance of the data engine can consume all CPU resources to process requests.</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Server</td>
<td>Manages connections to Tableau Server data</td>
<td>Yes</td>
<td>Because it’s a proxy, it’s normally only bound by network, but it can be bound by CPU with enough simultaneous user sessions. Its load is generated by browser- and Tableau Desktop-</td>
<td>Yes</td>
</tr>
<tr>
<td>DataServer.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>File Store</td>
<td>Auto-matically replicates extracts across data engine nodes</td>
<td>n/a</td>
<td>Installed with data engine (cannot be installed separately). A file store process will always be present if there are one or more data engine processes installed.</td>
<td>No</td>
</tr>
<tr>
<td>Repository</td>
<td>Tableau Server database, stores workbook and user metadata</td>
<td>n/a</td>
<td>Normally consumes few resources. It can become a bottleneck in rare cases for very large deployments (thousands of users) while performing operations such as viewing all workbooks by user or changing permissions. For more information, see Tableau Server Repository.</td>
<td>No</td>
</tr>
<tr>
<td>Search &amp; Browse</td>
<td>Handles fast search, filter, retrieval, and display of content metadata on the server</td>
<td>Yes</td>
<td>The process is memory bound first, and I/O bound second. The amount of memory used scales with the amount of content (number of sites/-projects/workbooks/datasources/views/users) on the server.</td>
<td>No</td>
</tr>
<tr>
<td>VizQL Server</td>
<td>Loads and refresh jobs for Tableau Server data sources.</td>
<td>Yes</td>
<td>Consumes noticeable resources during startup.</td>
<td>Yes</td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>----------------</td>
<td>-------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>renders views, computes and executes queries</td>
<td></td>
<td>key view loading and interactive use from a web browser. Can be CPU bound, I/O bound, or network bound. Process load can only be created by browser-based interaction. Can run out of process memory.</td>
<td></td>
</tr>
</tbody>
</table>

Tableau Server Coordination Service

Tableau Server uses the Coordination Service to coordinate activities on the server, including for high availability installations. The Coordination Service is built on Apache ZooKeeper, an open-source project.

The hardware for your cluster can have some effect on how well the Coordination Service runs. In particular:

- Memory. The Coordination Service maintains state information in memory. By design, the memory footprint is small, and is typically not a factor in overall server performance.

- Disk speed. Because the service stores state information on disk, it benefits from fast disk speed on the individual node computers.

- Connection speed between nodes. The service communicates continuously between cluster nodes; a fast connection speeds between nodes helps with efficient synchronization.
Configuration for the Coordination Service

The Coordination Service is installed automatically as a part of Tableau Server. The number of nodes with the Coordination Service installed depends on the total number of nodes in the Tableau Server installation. On a one- or two-node system, one instance of Coordination Service is installed. On a three- or four-node installation, three instances of Coordination Service are installed. For Tableau Server installations that have five or more nodes, a total of five Coordination Service instances are installed. (The Coordination Service is installed on the first <n> nodes in the cluster, so on a one- or two-node cluster it is installed on the first node, on a three- or four-node cluster it is installed on the first three nodes, and on a cluster of five or more nodes it is installed on the first five nodes.)

You do not have to explicitly configure the coordination service, and there are no settings you can make for the service. As a consequence, when you add a node to your cluster, you do not see the configuration service listed as process—for example, you do not see the coordination service listed in the Add Tableau Server dialog box:
The **Base Install** option includes the Coordination Service and Cluster Controller. As you can see, this option is disabled, because you cannot choose when to install those services.

The Coordination Service Quorum

To ensure that the Coordination Service can work properly, the service requires a *quorum*—a minimum number of instances of the service. This means that the number of nodes you have in your installation impacts how many instances of the Coordination Service are running.

**If you reduce the number of nodes**

If you reduce the nodes in your cluster from three (or more) to two nodes, a warning tells you Tableau Server can no longer support high availability:

A minimum of three Tableau Server nodes are required for high availability. You can add a third node now, or continue with only two nodes. Continuing with only two nodes means Tableau Server will not be highly available. You can always add a third node later. Click OK to continue with 2 nodes, or Cancel to go back and add a node.

If you continue, Tableau Server will run, but you will not have any automatic failover of the repository.

**Viewing Coordination Service Status**

The Coordination Service is not included in the listing when you `view server process status`. To see the state of the service, you can use the following `tabadmin` command:

```
  tabadmin status --verbose
```

The output from the command shows you whether the service is running:

```
  10.32.139.21:
      Status: RUNNING
      'Tableau Server Data Engine 0' (2456) is running.
```
'Tableau Server Vizqlserver 0' (3336) is running.
'Tableau Server Backgrounder 0' (11976) is running.
'Tableau Server CacheServer 0' (2508) is running.
'Tableau Server Dataserver 0' (3572) is running.
'Tableau Server Application Server 0' (804) is running.
'Tableau Server API Server 0' (3584) is running.
'Tableau Server Coordination Service 0' (2624) is running.
'Tableau Server Search and Browse 0' (2744) is running.
'Tableau Server Gateway' (2824) is running.
'Tableau Server Cluster Controller' (2840) is running.
'Tableau Server Repository' (2032) is running (Active Repository).
'Tableau Server File Store' (2964) is running.

Performing Cleanup for the Coordination Service

The Coordination Service maintains state information about the server, such as transaction logs of activities on the server. This information is written to disk, and when the server is restarted, the information on disk is used to restart the Coordination Service and to determine state information such as whether multiple repositories have been synchronized.

If the data maintained by the service is corrupted (for example, due to hardware problems) or if there is some other problem with the Coordination Service that affects server startup, you can perform a cleanup operation on the service’s information. To do so, run the following `tabadmin` command:

```
tabadmin cleanup --reset-coordination
```

This command will perform a normal cleanup as well as removing Coordination Service files.

**Note:** This command can only be run when the server is stopped.
Tableau Server File Store

The Tableau Server File Store process is installed along with the Data Engine and controls the storage of extracts. In highly available (HA) environments, the File Store ensures that extracts are synchronized to other file store nodes so they are available if one file store node stops running.

<table>
<thead>
<tr>
<th>Process</th>
<th>File Store</th>
</tr>
</thead>
<tbody>
<tr>
<td>File name</td>
<td>filestore.exe</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the File Store process is visible on the Status Page. For more information, see View Server Process Status</td>
</tr>
<tr>
<td>Logging</td>
<td>Logs are located in \logs\filestore. For more information, see Server Log File Locations</td>
</tr>
</tbody>
</table>

The decommission Command

If you want or need to remove a file store you should decommission the file store first, using the decommission command. Decommissioning puts the file store into read-only mode and copies any unique data contained in the file store to the other file store(s) in the cluster. While a file store is being decommissioned, this shows on the Status page, and once all unique content has been copied to other file store nodes, the decommissioned node shows as ready to be removed.

Tuning the Cluster Controller Timeout Threshold

Tableau Server uses a coordination service (built on Apache ZooKeeper) to maintain configuration information and manage synchronization across the components in Tableau Server. This topic discusses the behavior of the coordination service, how that can affect repository and failover behaviors under some circumstances. This topic also describes how to tune the coordination service, if necessary, to the hardware performance of the computer that Tableau Server is running on.
Coordination Service and disk I/O

The Coordination Service process writes Tableau Server configuration information to disk. Therefore, disk I/O performance is critical for the service. If disk I/O falls below a certain threshold (by default, 5 megabytes per second), Tableau Server restarts the Coordination Service process.

A number of factors may cause the Disk I/O performance to drop below the 5 MB/sec threshold:

- Tableau Server is running on hardware at or below the low end of the recommended hardware configuration
- Tableau Server is installed on a computer where other disk I/O-intensive software is running
- Tableau Server is processing disk I/O-intensive operations, such as publishing large extracts

In these cases, Tableau Server might restart the Coordination Service process.

Coordination Service and the Cluster Controller timeout

The Cluster Controller process monitors the health of services across the cluster, including the coordination service. The Cluster Controller process has a timeout value set to five minutes (versions prior to 9.0.5 default to one minute).

After this interval, the Cluster Controller process triggers a failover from the active repository to the passive repository. On a single-node Tableau Server installation, the Cluster Controller process triggers a restart of the Repository process.

This behavior is by design. Tableau Server does not allow a repository to get too much out of date and will switch to a more up-to-date repository to allow the out-of-date one to get caught up.

Tuning the Cluster Controller timeout threshold

A long (five minute) timeout threshold makes Tableau Server less sensitive to temporary coordination service outages. If the service stops due to a brief spike in disk I/O, then restarts
before the end of the timeout period, Tableau Server remains available and does not need to failover.

However, a longer timeout period can have implications for systems that fail over due to issues other than temporary coordination service unavailability. The increased timeout period creates a longer window during which information written to the active repository could be lost if a failover takes place.

If you are running robust hardware and you have not been seeing disk I/O bottlenecks or performance issues, then you should consider setting a shorter timeout threshold for the Cluster Controller. Setting a shorter interval limits the potential data loss window by reducing the time during which the active repository is updated without a corresponding update to the passive repository.

If you are seeing disk I/O bottlenecks, do not decrease the timeout threshold, or do so in small increments. As discussed above, one circumstance that can cause a failover is when the Coordination Service process is not available because it is restarting due to low disk I/O performance. In that case, the repository failover occurs because of a lack of reporting from the Coordination Service, not because the repository is truly out of date. On underpowered hardware, especially hardware with limited disk I/O, the coordination service might temporarily drop its connection. As a result, tuning the timeout threshold too low will result in frequent failovers.

**To reset the timeout**

Run the following sequence of tabadmin commands

```
tabadmin set clustercontroller.zk_session_timeout_ms 60000

tabadmin config

tabadmin restart
```

This sets the timeout to 60000 milliseconds (60 seconds).
Tableau Server Gateway Process

The Tableau Server gateway process is an Apache web server component (httpd.exe). Its role is to handle requests to the server from all clients—Tableau Desktop, mobile devices, a proxy, a load balancer, etc.

The server runs a single instance of the gateway process; you can’t run more than one per machine.

Port assignment

By default, the gateway process listens for requests on port 80 (for HTTP requests) and 443 (for SSL requests). When you install Tableau Server on a computer, part of the server configuration makes sure that this port is open in the computer’s firewall. If the computer is running a different process that requires port 80, you can change the port assignment for the gateway process. You can do this in the Tableau Server Configuration tool:
Alternatively, you can run the following `tabadmin` command, where `nn` is the new port number:

```
tabadmin gateway.public.port nn
```

Log files for the gateway process

The gateway process creates two sets of log files in the `\logs\httpd` folder of the log file archive:

- Activity logs. The name for these log files has the format `access.yy_mm_dd_hh_mm_ss.log`.

- Error logs. All errors are logged in a single file named `error.log`.

For more information, see Archive Log Files.

Gateway processes in a cluster

If your server environment is distributed across multiple machines, you can run a single gateway process on each node of the cluster. The most common scenario for running a gateway
process on multiple computers in the cluster is that you have a load balancer in front of the cluster. In this scenario, the load balancer distributes requests to any gateway in the cluster. If you need to take a node off line (for example, to perform maintenance on that node), you can disable the load balancer’s routing to that machine. When the maintenance is complete, you can re-enable the node on the load balancer.

You must have a gateway process running on at least one computer in the cluster. If you remove the gateway process from the primary server, you must make sure that another computer in the cluster is running the gateway process. You must also make sure that that computer is reachable by clients.

If the Tableau Server is configured to use SSL, you must make sure that the certificate for SSL support is in the same location on each computer in the cluster that has the gateway process running. For more information about using SSL, see Configure External SSL.

Similarly, if the server installation uses a custom logo, the logo must be in the same location on every computer that is running the gateway process.

If you need to change the port number that the gateway process listens on, as explained earlier, you can use the configuration dialog box or run the following command for each worker computer that is running the gateway process:

```
tabadmin workerN.gateway.port nn
```

Additional information

Configuring Proxies for Tableau Server

Add a Load Balancer

Configure for Failover and Multiple Gateways

Tableau Server Repository

Tableau Server Repository is a database that stores server data. This data includes information about Tableau Server users, groups and group assignments, permissions, projects, data sources, and extract metadata and refresh information.
<table>
<thead>
<tr>
<th>Process</th>
<th>Repository</th>
</tr>
</thead>
<tbody>
<tr>
<td>File name</td>
<td>postgres.exe</td>
</tr>
<tr>
<td>Status</td>
<td>Status of the Repository is visible on the Status Page. For more information, see View Server Process Status</td>
</tr>
<tr>
<td>Logging</td>
<td>Logs generated by the repository are located in \logs\repository. For more information, see Server Log File Locations</td>
</tr>
</tbody>
</table>

Preferred active repository

When you configure Tableau Server after the initial installation, you have the option to specify a **Preferred Active Repository**. This is an optional step, and if you do not specify a preferred active repository, Tableau Server will select the active repository on startup.

Configure a preferred active repository if you want Tableau Server to select a specific node on startup. You might want to do this if you have a particular server you want to use for your active repository (a computer with more disk space or memory for example), or if you are using custom administrative views. Custom administrative views have embedded connection information that refers to the repository for which you created the views. For more information on connecting to the Tableau Server repository, see Collect Data with the Tableau Server Repository

The failoverrepository Command

If failover occurs and your passive repository becomes the active repository, it remains the active repository until either Tableau Server restarts or you use the
failoverrepository command to switch back. Specify the repository you want to be the active one, or specify that the preferred active repository (if configured) should be made active again. For more information, see failoverrepository.

Server Process Limits

When you reconfigure processes for Tableau Server, there is a limit to the amount that you can increase the number of process instances. By default, the limit is set to eight. If your machine has enough RAM and CPU cores, and you want to go above this limit, you can change the limit using the service.max_procs tabadmin setting. For each process instance, Tableau recommends that the machine running the process have at least 1 GB of RAM and 1 logical CPU core.

To change the maximum number of processes allowed:

1. After Setup, stop the server.

2. In the Tableau Server bin directory, type the following command, where number is the maximum number of process instances you want to allow:

   tabadmin set service.max_procs <number>

   For example:

   tabadmin set service.max_procs 10

3. Still in the bin directory, type:

   tabadmin config

4. Start the server so the changes can take effect.
Changing Authentication

Infrastructure or business changes may require you to change the authentication type on Tableau Server. In this context, authentication refers to the core authentication type that you’ve configured on Tableau Server: local authentication or Active Directory. See Authentication to learn more.

You can change from local authentication to Active Directory or you can change from Active Directory to local authentication. In either case, to change the authentication type, you complete these steps:

1. Uninstall (including manual deletion of directories) and then reinstall of Tableau Server. The procedure for full uninstall and clean install are at the end of this topic.
2. Restore content and permissions.

**Warning**

Changing the authentication type on Tableau Server can be a complicated and time-consuming process. To avoid data loss or orphaning of content or users, you’ll need to plan this process carefully.

Most importantly, determine how you will transition content and permissions to the new authentication model after you reinstall Tableau Server.

Methods for restoring content and permissions

The following list describes three methods for restoring content and permissions after you reinstall Tableau Server. Select the method that best fits with your environmental requirements.

- **Method 1: Use site export and import**—In this method, you start by exporting each site in your existing deployment. Then, you install the new server and configure it for the new authentication type. You then create new users in the default site on the new server. Finally, you import all the original sites. During the import stage, you can
map the original identities to the new users that you created in the default site.

Because this method exports all content and permissions at each site, it is the best method for organizations that require a high fidelity replica of the content and permissions after the authentication change is complete. In most cases where organizations need to change the authentication type, a different user name syntax is often a requirement. This method, which includes a process of mapping original user names to new names, provides flexibility for such scenarios.

- **Method 2: Fresh installation; users republish content**—In this method, you install a new version of Tableau Server and select the new authentication method during setup. You also create new sites. You then create users and give them access, and they republish their workbooks and data sources. Unlike the other methods, in this one, you do not reuse any of your existing Tableau Server infrastructure.

This method is most appropriate for smaller deployments with fairly autonomous and data savvy users. From an administrative perspective, this method is the simplest, since you’re not actively porting over content. However, because you rely entirely on users to republish content, this method may not be successful for large organizations or for those where centralized oversight of content is required.

- **Method 3: Restore and manually assign content**—In this method, you begin by documenting the content ownership model. Then you take a backup of the server, uninstall the existing Tableau instance, delete the install directory and then install a new instance with the new authentication type. After installation, you manually create new users that correspond to users on the original system. You then restore the backup to upload content. Lastly, you reassign content to users as appropriate. This method requires careful planning and implementation to avoid orphaned users and content.

This method is best if you are archiving more content than you are reassigning. In this context, "archiving" content means that you're reassigning old content to a single administrative user rather than to individual users. On the other hand, if all (or most) of
your users need to maintain control over the content that they have on the existing system, then you must manually reassign all of the content to match the original ownership model. In addition to the cost of reassigning content after the change, you must also document content ownership before the change.

User names and the Tableau Identity store

Unless you select Method 2 above, it’s helpful to understand how Tableau Server stores user names in the Tableau identity store. Tableau stores all user identities in the repository, which coordinates content permissions and site membership with various services in Tableau Server. Generally, servers configured with Active Directory authentication store user names in the format, domain\username. Some organizations use a UPN (name@domain.lan). On the other hand, organizations that configure Tableau Server with local authentication usually create standard, truncated user names, such as jsmith.

In all cases, these user names are literal strings that must be unique in Tableau identity store for the purpose of identity management. If you are changing from one authentication type to another, then your target authentication, SSO, or user provisioning solution may require a specific user name format.

Therefore, to maintain all permissions, content, and user viability, one of the following must be true after you change the authentication type:

- The new user names must match the original user names.
- The original user names must be updated to match a new format.

In most cases, your new authentication plan will impose a user name syntax that is different than your original user names. In that case, we recommend using Method 1 - site import to change authentication type. The site import method includes a process where you can map original user names to new user names.

It’s possible that the original user name format will work with the new authentication type. For example, if you used UPN names in a local authentication deployment, you might be able to use the same user names in an Active Directory deployment. You could also use the domain\username format for local authentication, as long as users continued to use that
format to sign in to Tableau Server. For these cases, Method 3 might be the most efficient way to change the authentication type.

If you are changing from local authentication to Active Directory authentication, review the topic, User Management in Active Directory Deployments, as part of your planning process.

Method 1: Use site export and import

1. Export all sites on your server. See Import or Export a Site.
2. Back up, uninstall, and then reinstall.
3. Create new users on Tableau Server. You should have a new user that corresponds to each user on the original server.
4. Import the sites that you exported in Step 1. See Import or Export a Site. During import, you will be prompted to map the new users to the original users.

Method 2: Fresh installation—users republish content

Even if you do not plan to port content as part of your authentication change, we recommend that you back up the server.

1. Back up, uninstall, and then reinstall.
2. Create users, sites, and groups.
3. Inform your users of the new Tableau Server, provide them with credentials, and allow them to republish their content.

Method 3: Restore and manually assign content

Before you begin this method, we recommend that you document the existing deployment. Specifically, gather the following information from the existing server:

- User information: user names, display names
- Sites: site names and users in each site
- Groups: group names and permissions
- Content: workbooks, views, data sources

After you have gathered this information, follow these steps:
1. Follow the procedures detailed below (Back up, uninstall, and then reinstall). However, when you are prompted to create a new administrative account, close the browser without creating the account. You will create a new administrative account later in this procedure.

2. Open Windows Command Prompt as an administrator and navigate to the Tableau Server bin directory by typing the following command:

   ```
   cd C:\Program Files\Tableau\Tableau Server\<version>\bin
   ```

3. Type the following command to restore the backup file without inheriting the previous configurations:

   ```
   tabadmin restore [path\file name] --no-config
   ```

   After restoring your backup file, a browser window will display and you will be prompted to create a new administrator account again. Ignore this, and close the browser window. If you are prompted to enter the Run As User password, type the password and continue with the next step. You will not see a password confirmation.

4. In the Command Prompt window, from the Tableau Server bin directory, type the following command to reset Tableau Server back to a state that requires an administrator account to be created:

   ```
   tabadmin reset
   ```

5. Open a browser window, and enter `http://localhost` in the address bar to create the administrator account for Tableau Server.

   If you are using Active Directory authentication, the account for the Tableau Server administrator account must be an existing Active Directory user.

6. Sign in to Tableau Server. Users from your previous installation have been migrated. These users are not valid and will need to be deleted.

7. Create new users and assign content to those users as appropriate.
Back up, uninstall, and then reinstall

All methods include the following steps:

1. Back up Tableau Server
2. Uninstall Tableau Server.
3. Reinstall Tableau Server with the new authentication type.

Step 1: Back up Tableau Server

Follow the procedure, Creating a regular backup. Run the `backup` command with the `-d` and the `-v` options. The `-d` option adds the datestamp, and the `-v` option verifies the state of the database for backup and restore.

When you are finished, copy the backup file (.tsbak) to a safe location that is not a part of your Tableau Server installation.

Step 2: Uninstall Tableau Server

1. From the Start menu, go to Control Panel > Programs and Features. Select Tableau Server, and then click Uninstall.
2. When Tableau Server has been uninstalled, open Windows Explorer and navigate to \\Program Files\\Tableau.
3. Delete the Tableau Server folder.
4. While still in Windows Explorer, navigate to \\ProgramData\\Tableau (this is a hidden directory), and then delete the Tableau Server folder.

**Note:** If you have installed Tableau Server on a drive other than the system drive, the folder paths will be different than those shown here. See Installation directory for more information.

Step 3: Reinstall Tableau Server with new authentication type

1. Go to the Tableau Customer Portal, sign in with your Tableau user name and password, and then download Tableau Server.
2. Install Tableau Server. See Install and Configure for more information. During installation, you will select the new authentication method. See Configure General Server
Options. If you are running Method 3, then ignore the prompts (close the browser window) to create a new administrative account on reinstall.

Navigate Server Admin Pages

As a server administrator, you can access all of the menus and pages in Tableau Server for server and site management. If your server is configured for multiple sites, the site menu is available for navigation. Click **Manage All Sites** in the site menu to access server administration pages.

The server administrator pages include server-wide settings that you will use to configure, monitor, and maintain Tableau Server.

For information on navigating content pages, "Navigate Tableau Server" and "Access and Manage Your Content" in Tableau Server help.

Server Administrator Pages

In a single-site deployment, all server and site menus are available to you in the main menu. To create a site, click **Settings > Add a Site**.

On a multi-site server, when a site is selected, you will see these menus:

To access server administration pages, click the site menu, and then select **Manage All Sites**:
On a multi-site server, these are the server administration menus. The site menu text changes to **All Sites** to let you know you are managing server-wide settings.

To return to the site administration menus, click **All Sites**, and select the site you want to manage.
Server administrators can:

- Monitor server status and activity.
- Generate log files.
- Add sites and edit site settings. Only server administrators can add sites to the server.
- Add users to the server, and assign users to sites.
- Add and manage site groups.

To manage site-related settings, you must first navigate to a specific site. Within each site, you can:

- Manage content and assign permissions.
- Manage schedules for extract refreshes and subscriptions.
- Monitor site activity and record workbook performance metrics.
• Manage storage space limits for content published by users.

• Allow web authoring.

• Enable revision history.

• Allow site administrators to add and remove users.

• Allow users to subscribe to workbooks and views, and allow content owners to subscribe others to workbooks and views.

• Enable offline snapshots for favorites (iOS only).

Add Users to the Server

In a single-site environment, server administrators can add users on the Users page.

After you add a site to Tableau Server, it becomes a multi-site server with a Server Users page (all server users from every site appear here) and a Site Users page. Only server administrators can access the Server Users page, and both site administrators and server administrators can access the Site Users page.
The Server Users page is the only place where you can assign users to multiple sites, delete users from the server, and if the server is using local authentication, reset user passwords.

The following procedure describes how to add users to the server. There are two approaches you can take: One at a time (described below) or in batches using the Import command, which relies on a CSV file (described in Import Users and CSV Import File Guidelines).
To add a user to the server

1. In the site menu, click **Manage All Sites**, click **Users**, and then click **Add Users**.

![Server Users](image)

2. If you are using local authentication, click **New User**. If you are using Active Directory, click **Active Directory User**.

Enter a user name.

- **Local authentication**: If the server is using local authentication, using an email address for the user name is the best way to avoid user name collisions (for example, *jsmith@example.com* instead of *jsmith*).

- **Active Directory**: If you are adding a user that is from the same Active Directory domain that the server is running on, you can type the AD user name without the domain. The server domain will be assumed.

Before adding users, be sure to review User Management in Active Directory Deployments to understand how multiple domains, domain naming, NetBIOS, and Active Directory user name format influence Tableau user management.

**Note**: Do not enter the user's full name in this field; it can cause errors during the importing process.

3. If the server is using local authentication, provide the following:
- Display Name—Type a display name for the user (e.g., John Smith).

- Password—Type a password for the user.

- Confirm password—Retype the password.

- Email—This is optional and can be added at a later time in the user profile settings.

- Selected users are Server Administrators: Specify whether the user should be a server administrator.

- Name (Site Membership) / Site Role: If the user is not a server administrator, you can assign a user to zero or more sites, along with a site role for each site. You do not have to choose site membership and site role at this time. If you don't specify site membership and site role for a new server user, the user will be added as a Server User only, with a site role of Unlicensed. For details on site roles, see Set Users’ Site Roles.
4. Click Create.

Extracts and Refresh Schedules

Tableau Desktop authors and data stewards can create and publish data extracts. Extracts are copies or subsets of the original data connection. Because extracted data is imported into the Tableau data engine, workbooks that connect to extracts generally perform faster than those that use live database connections. Extracts can also increase functionality.

Setting up refresh schedules

As a server administrator, you can enable scheduling for extract refresh tasks, and then create, change, and reassign schedules. General scheduling options you change on the server
are available as part of the publishing process when a Tableau Desktop user publishes an extract.

Schedules that you create have the following options:

**Priority**

The priority determines the order in which refresh tasks are run, where 0 is the highest priority and 100 is the lowest priority. The priority is set to 50 by default.

**Execution mode**

The execution mode indicates to the Tableau Server backgrounder processes whether to run refreshes in parallel or serially. Schedules that run in parallel use all available backgrounder processes, even if the schedule contains only one refresh task. Serial schedules run on only one backgrounder process.

By default, the execution mode is set to parallel, so that refresh tasks finish as quickly as possible. You might want to set the execution mode to serial (and set a lower priority) if you have a very large schedule that prevents other schedules from running.

**Frequency**

You can set the frequency to hourly, daily, weekly, or monthly.

For information, see Create or Modify a Schedule.

**Refreshing extracts manually**

In the Tableau Server web environment, both server and site administrators can run extract refreshes on-demand on the Schedules page:

- Select the schedule and click **Actions > Run Now**.

You can also refresh extracts from the command line using the `tabcmd refreshextracts` command. For more information, see `tabcmd Commands`. 
Refreshing extracts from Tableau Desktop

Tableau Desktop users can refresh extracts they publish and own. They can do this the following ways:

- **At publish time**: When an author publishes a workbook or data source that uses an extract, that author can add it to server refresh schedule. The refresh can be a full or an incremental refresh.

  Incremental refreshes reference a column in the extract that has a data type of date, date/time, or integer; such as a timestamp. Tableau uses this column to identify new rows that need to be added to the extract. For more information, see Refreshing Extracts and Schedule Extract Refreshes as You Publish a Workbook in the Tableau Desktop Help.

- **User interface**: In Tableau Desktop, you can use the Refresh from Source, Add Data From File, and Add Data From Data Source commands to upload an addition to or refresh an extract on Tableau Server. A user might want to do this if Tableau Server doesn’t have sufficient credentials to access the underlying data. For more information, see Updating Extracts on Tableau Server in the Tableau Desktop Help.

- **Data Extract command line utility**: The Data Extract command line utility installs with Tableau Desktop. You can use it to append to or refresh a published extract. For more information, see Tableau Data Extract Command Line Utility in the Tableau Desktop Help.

See also

Enable Extract Refresh Scheduling and Failure Notification

Automate Refresh Tasks

Set Up Subscriptions

When users subscribe to a workbook or view, a snapshot of the view is email to them on scheduled basis, so they can see the latest updates without having to sign into Tableau.
Server. Administrators, project leaders, and content owners have the option to subscribe other users to workbooks and views. For more information, see *Subscribe to Views*.

As an administrator, you determine whether subscriptions are enabled for a site, and you create the subscription schedules that are available to users. For more information, see *Create or Modify a Schedule*.

Requirements

Before users can receive subscriptions, Tableau Server administrators need to put the following things into place:

- **Embed database credentials or don't require them**: To email data in a subscribed view, Tableau Server needs to access the data without user involvement. This can be accomplished by using a workbook with embedded database credentials, a Tableau Server data source, or data that doesn't require credentials (such as a file that's included with the workbook at publish time). Users can't subscribe to workbooks that prompt for credentials for live database connections.

- **Ensure that users have necessary permissions, and an email address in Tableau Server**: If a user can see a view or workbook on Tableau Server and it has the subscription icon (🔔) in the upper right corner, he or she can subscribe to it. The ability to see a view or workbook is controlled by the *View* permission. A user must also have an email address in their Tableau Server account; if they don't, Tableau Server prompts for one when they subscribe to a view. Users can change their delivery options, unsubscribe, or update their email address on their.

- **Avoid trusted authentication for embedded views**: If you use restricted tickets (the default) to render an embedded view, the Subscribe button doesn’t appear.

Configure the server to send subscription emails

1. In the *Tableau Server Configuration utility*, click the *Alerts and Subscriptions* tab, and then select *Enable users to receive emails for subscriptions to views*.

2. Configure SMTP Setup.
Enable subscriptions in a site

As an administrator, you decide which sites allow subscriptions.

1. At the top the browser window, click Settings.

2. Select **Allow users to subscribe to workbooks and views**.

3. Optionally, select **Allow content owners to subscribe other users to workbooks and sheets**, or enter a site-specific "From" address or message footer.

4. Click Save.

Test subscriptions in a site

1. **Create a standard user account** so you can receive subscriptions. (In the Server Administrator role, you can't.)

2. **Subscribe to a view**.

3. At the top the browser window, click **Schedules**.

4. Select the schedule you chose for the subscription, and then click **Actions > Run Now**.

   A snapshot of the view should be emailed to you within 10 minutes. If you experience
Manage all user subscriptions

1. At the top the browser window, click **Tasks**, and then click **Subscriptions**.

   All user subscriptions for the current site appear, including information like subscriber name, view name, and delivery schedule.

2. Select any subscription you want to update. From the **Actions** menu, select **Change Schedule**, **Change Subject**, **Change Empty View Mode**, or **Unsubscribe**.

   (The empty-view option sends subscription emails only when data exists in a view. It's a good choice for high-priority alerts.)

**Enable Extract Refresh Scheduling and Failure Notification**

Before your publishers can schedule extract refreshes, you must enable scheduling on the server.

While you’re enabling scheduling, you can decide whether also to enable sending email to data source or workbook owners when extract refreshes do not complete successfully. You
can read more about these emails below. When you enable refresh failure notification, users can opt out individually by changing their account settings.

1. Sign in as a server administrator, and select Settings.

2. On the General page, do the following:

   - To enable refresh failure notification, under Email Notification, select Send email to data source and workbook owners when scheduled refreshes fail.

   - To enable scheduling, under Embedded Credentials, select both check boxes to allow publishers to embed credentials and schedule extract refreshes.

   Automatic refresh schedules require direct access to the data, which you allow by embedding credentials in the connection.

   ![Email Notification and Embedded Credentials](image)

   **Note:** On a multi-site server, email notifications are a site setting and embedded credentials are a server setting.
Managing schedules from the server

In your organization it might be more appropriate to manage embedded credentials and refresh schedules centrally from the server. If you do that, you might clear the check boxes in the Embedded Credentials section described in the steps above, so that Tableau Desktop publishers do not see schedule options during publishing.

Managing schedules centrally enables you to distribute extract refresh and subscription tasks, so you can run them when most people are offline. It also enables you to oversee which credentials are embedded in connections.

For more guidelines for managing schedules and refreshes on the server, see Provide access to data sources and Keep data fresh in Everybody’s Install Guide.

How refresh failure emails work

The email notification for a failed extract refresh lists the extract name and location on the server, gives the time of last successful refresh, the number of consecutive times the refresh has failed, and suggests the reason for the failure and possible solution.

After five consecutive failures, the refresh schedule is suspended until you or the data owner takes an action to address the cause of the failure, such as updating database credentials or a path to the original data file.

How the last successful refresh date is determined

The last successful refresh date and time are shown when that last refresh occurred within a number of days. By default it is 14 days, and this value is set in wgserv-er.alerts.observed_days. If the number of days since the last successful refresh exceeds the number specified in this setting, the message in the email shows “not in the last $N$ days.”

Create or Modify a Schedule

The Schedules page shows a list of schedules, including their name, type, what they’re for (scope), number of tasks, behavior (concurrent or serial processing), and when they are
scheduled to run.

To create a new schedule

1. In a site, click **Schedules**.

2. Click **New Schedule**.

3. Specify a descriptive **Name** for the schedule. For example, End of week.

4. Select a **Task type** the schedule will handle—either refreshing extracts or delivering subscriptions.
5. Optionally you can define a **Default Priority** from 1 to 100, where 1 is the highest priority. This is the priority that will be assigned to the tasks by default. If two tasks are pending in the queue, the one with the higher priority runs first.

6. Choose whether a schedule will run in parallel or serially. Schedules that run in parallel run on all available backgrounder processes so that they can complete faster.

7. Finish defining the schedule. You can define an hourly, daily, weekly, or monthly schedule.
8. Click **Create**.

To modify an existing schedule

1. Navigate to the Schedules page.

2. Select an existing schedule, click the Actions drop-down arrow, and then select **Edit Settings**.
3. Finish editing the schedule, and click **Save**.

See also

Manage Refresh Tasks

Extracts and Refresh Schedules

**How Refresh and Subscription Tasks are Prioritized**

**Note:** This topic covers prioritization of background tasks for extract refresh and subscription schedules.

Scheduled extract refreshes and subscriptions are run in this order:

1. Any task already in process is completed first.

2. Any task that you initiate manually using **Run now** starts when the next backgrounder process becomes available.

3. Tasks set with the highest priority (the lowest number) start next, independent of how long they have been in the queue.
For example, a task with a priority of 20 will run before a task with a priority of 50, even if the second task has been waiting longer.

4. Tasks with the same priority are executed in the order they were added to the queue.

   The first task added to the queue starts first; the second task starts after that.

5. When multiple tasks with the same priority are scheduled to run at the same time, they start in the order they were created or enabled. There is no distinction between extract refreshes and email subscriptions.

The following limitations also impact scheduled tasks:

- Tableau Server can run only as many concurrent tasks as backgrounder processes are configured.
- Separate refreshes for the same extract cannot run at the same time.
- Tasks associated with a schedule that is set to run serially must themselves run one at a time.

**Move Tableau Server to Another Drive**

By default Tableau Server is installed to the system drive (usually C:\). This means that all program and data files are installed to that drive. If you need to move Tableau Server to a different drive (if you are running out of space on the original drive, for example), you can do this by following the procedure below. The steps are intended as an example for moving Tableau Server from one drive to another drive on the same computer, and may not exactly reflect your installation and configuration.

**Before you start**

Before starting, make sure you:
- Have administrative credentials to the primary Tableau Server computer. This is where you will be working and you need to be logged on to the computer as an administrator.
- Have a copy of the installation program for the version of Tableau Server you are moving. You need this to install Tableau Server to the new drive.
- Know what authentication methods your current installation is using. If Tableau Server is configured for SSL, SAML, or Kerberos, you will need to back up the related certificate or keytab files separately, and then copy them to the new drive after you reinstall Tableau Server.

When you are ready to move Tableau Server to another drive:

1. Open a command prompt as an administrator on the primary Tableau Server computer.
2. Navigate to the Tableau Server \bin directory. By default this is:
   
   C:\Program Files\Tableau\Tableau Server\<version>\bin

3. Stop Tableau Server:
   
   tabadmin stop

4. Back up your Tableau Server data:
   
   tabadmin backup <filename>

   Where <filename> is the name of the backup file. The file will have a .tsbak extension.

   Save the backup file to a safe location. You need this to restore your server after installing it to the new drive.

5. If Tableau Server is configured for SSL, SAML, or Kerberos, make a copy of the folder that contains the related certificate or keytab files and save it to a location that is not part of the Tableau Server install path (for example, C:\TServer-hold). Find the location of the related files by opening the Tableau Server Configuration utility and clicking the appropriate tab.
6. Uninstall Tableau Server using Control Panel and Add/Remove programs. You should also rename the \ProgramData\Tableau\Tableau Server and \Program Files\Tableau\Tableau Server\<version> directories so your new installation does not find them. By default the \ProgramData directory is hidden, so you may need to configure Windows to display hidden files and directories to find it. Later, once you have installed Tableau Server to the new location and verify that everything is working, you can delete the directories.

7. Install Tableau Server to the new drive.

At the end of the install process a browser window will open and you will be prompted to create an initial administrative user. Close this without creating the user.

8. Open a command prompt as an administrator.

9. Navigate to the Tableau Server \bin directory in your new install location.

10. Restore your Tableau Server data backup from Step 4 above using the --no-config option:

    tabadmin restore --no-config <filename>

    Where <filename> is the name of the .tsbak file you created when you backed up your original installation.

11. If you had SSL, SAML, or Kerberos configured, copy the folder with your certificates to the new drive. For example:

    a. If you are using SSL and installed Tableau Server to D:\Tableau\Tableau Server, copy the SSL folder to D:\Tableau\Tableau Server\SSL.

    b. Run the Tableau Server Configuration utility and on the SSL tab, update the paths to the new location for the certificate files.

    c. Click OK to close the Configuration utility.

Upgrade

Upgrade Tableau Server Overview

The topics in this section help you upgrade Tableau Server. The topics describe planning, testing, and actually upgrading your existing server installation. We include information about best practices, as well as steps for upgrading a single node server and a multi-node installation. Where possible, we call out possible pitfalls and help you to avoid these.

Research the Upgrade

Before you upgrade Tableau Server, we recommend that you plan the upgrade.

- Learn about the new version of Tableau Server, including what's new and what's changed.
  - What's Changed - Things to Know Before You Upgrade

**Note:** As of version 10.0 there are significant changes in the Tableau Server Setup program. Read about the Tableau Server Setup changes before you upgrade to version 10.0.

- Make sure the computers you are going to upgrade (both for the test environment and the production environment) meet the minimum hardware requirements. Minimum
requirements and recommendations can change from version to version.

- Minimum Hardware Requirements and Recommendations for Tableau Server

**Important:** As a best practice, you should never install a beta version of Tableau Server in your production environment. You should also never restore a production Tableau Server installation using a backup of a beta version.

- Understand how version compatibility might impact your installation of Tableau Server.
  - Desktop and Server Compatibility in the Tableau Desktop Help.

The following topics guide you through planning steps.

**What's Changed - Things to Know Before You Upgrade**

**What Changed in Version 10.1**

Version 10.1 includes some changes you should know about before upgrading.


The following sections summarize the significant changes to Tableau Server 10.1 and provide links for additional information.

- TabcmdInstaller.exe no longer installed with Tableau Server

TabcmdInstaller.exe no longer installed with Tableau Server

The Setup program for the tabcmd utility is no longer installed to the \extras folder when you install Tableau Server. The utility itself (tabcmd.exe) is still installed to the primary node when you install Tableau Server, but the separate Setup program for installing the utility on
other computers is not. If you need to install the tabcmd utility on additional computers, you can download it from Tableau Software. For details, see tabcmd.

What Changed in Version 10.0

Version 10.0 includes some changes you should know about before upgrading.


The following sections summarize the significant changes to Tableau Server 10.0 and provide links for additional information.

- Tableau Server Setup changes
  - Two-node installations are limited to a single instance of the repository
  - Domain change from tableausoftware.com to tableau.com
  - Minimum hardware requirements adjusted
  - Tableau Server is no longer available as a 32-bit application
  - Tableau Server no longer supports Windows Vista or Windows Server 2008
  - Tableau Server no longer supports older versions of Microsoft Internet Explorer
  - Tableau Server does not support Microsoft Internet Explorer 11 and higher in compatibility mode
  - API Server process (wgserver) has been removed

Tableau Server Setup changes

The changes described in this section have a significant impact on the upgrade process.
Manual uninstall of previous version is no longer required

Starting with version 10.0, you can upgrade Tableau Server without first manually uninstalling your previous version (when the previous version is 64-bit 8.2 or later). When you run the setup program, the existing version of Tableau Server is recognized and is uninstalled during the upgrade process.

**Note:** If you are upgrading to version 10.0 and want, you can manually uninstall the existing version before you upgrade, following the same upgrade process as you would in versions earlier than 10.0.

Setup gives you a backup option

If you follow the new workflow and let the Setup program uninstall your existing version of Tableau Server, you are prompted during the setup process create a full backup of your Tableau installation. This backup is a safety measure and is created for use in the event of an unexpected issue during upgrade. If you already have a backup of the current state of your installation, you can skip the backup during the upgrade to save time. For more information, see Tableau Server Upgrade Backup Options.

Two-node installations are limited to a single instance of the repository

If you configure a two-node installation of Tableau Server, you are limited to a single repository. If you are upgrading from a two-node installation that has two repositories, you will be prompted to remove one instance. For more information, see Install Tableau Server on a Two-Node Cluster.

Domain change from tableausoftware.com to tableau.com

As of version 10.0, the licensing server is located at tableau.com. In versions earlier than 10.0, this was located at tableausoftware.com. Any firewall rules or proxy configurations that specify tableausoftware.com must be updated for version 10.0. For more information on proxy settings, see Configuring Proxies for Tableau Server.
Note: Earlier versions of Tableau Server will continue to access the licensing server on the tableausoftware.com domain. If your organization is running versions of Tableau Server prior to 10.0, continue to use tableausoftware.com for proxy and firewall settings.

Minimum hardware requirements adjusted

With version 10.0, Tableau Server can be installed on a 2-core computer. (Previously, Tableau Server required at least 4 cores.) The 2-core configuration allows you to test Tableau Server on constrained hardware and is intended only for trials and prototyping. For more information, see Minimum Hardware Requirements and Recommendations for Tableau Server.

Tableau Server is no longer available as a 32-bit application

With version 10.0, Tableau Server is available only as a 64-bit application. For information about upgrading a 32-bit version of Tableau Server to version 10, see Upgrade from 32-bit to 64-bit Tableau Server.

Tableau Server no longer supports Windows Vista or Windows Server 2008

With version 10.0, Tableau Server no longer supports Microsoft Windows Vista or Windows Server 2008 (Windows Server 2008 R2 is still supported).

Tableau Server no longer supports older versions of Microsoft Internet Explorer

With version 10.0, Tableau Server no longer supports Microsoft Internet Explorer 8, 9, or 10.

This change impacts customers doing an initial install of Tableau Server on Windows 8.0 or Windows Server 2012 (non-R2). Neither of these operating systems supports Internet Explorer 11.

To complete configuration of Tableau Server you must use a browser on the server computer to add an administrator account. This requires browser that is supported by Tableau Server. This means that on Windows 8.0 and Windows Server 2012 non-R2, you must use
the latest version of Chrome, Firefox or Safari. You can uninstall this browser after the initial installation is complete.

**Note:** This only affects an initial installation and configuration, because no browser is required when upgrading or restoring Tableau Server.

For more information on the Microsoft policy for supporting Internet Explorer, see Microsoft Support Lifecycle.

Tableau Server does not support Microsoft Internet Explorer 11 and higher in compatibility mode.

Version 10.0 of Tableau Server does not support legacy compatibility modes in Internet Explorer 11 and higher.

This change impacts you if your users view web pages that have Tableau views embedded in them and that set Internet Explorer to compatibility mode with HTML DOCTYPE values. This can be an issue with SharePoint configurations that force compatibility mode. To avoid having users view web pages that put their browser into compatibility mode, either adjust configurations so that Internet Explorer is not put into compatibility mode, or use another supported browser, such as Chrome, Firefox, or Safari.

API Server process (wgserver) has been removed

The API Server process (wgserver) has been removed from Tableau Server. The process was available but disabled by default in version 9.3. The API Server process was formerly used to support the REST API, but as of version 9.3, this functionality was moved to the Application Server process. The API Server process is now removed, even if you explicitly enabled the process in a previous version of Tableau Server. For information about changes to the REST API, see What's New in the REST API.
Note: For historical reasons, some `tabadmin` configuration options will continue to use "wgserver" in the option name, but this does not refer to the old API server.

What Changed in Version 9.3

Version 9.3 includes some changes you should know about before upgrading.


The updates to Tableau Server 9.3 have the following impact:

New default configurations based on hardware

The Tableau Server installer detects your computer’s hardware and creates an optimal default configuration for a single-server installation and for the primary server in a multi-server installation. The new default configuration determines the number of processes to run for each Tableau Server process type.

When you upgrade from a single-server or multi-server installation in which you previously accepted the default configuration, the upgrade process changes the configuration to the new hardware-based default configuration. However, if you upgrade a server where you configured a custom number of server processes, the upgrade preserves the custom configuration—both for single-server and multi-server upgrades.

If after you upgrade you want to revert to the previous default configuration, use the following table to determine the number of processes to set in the Tableau Server Configuration utility based on the number of CPU cores on the primary server:

<table>
<thead>
<tr>
<th>Number of Processes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VizQL Server</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>Before 9.3</td>
<td>In 9.3</td>
</tr>
<tr>
<td>8 Cores</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>12 Cores</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16 Cores or more</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Note:** If the computer where you installed Tableau Server has fewer than eight CPU cores, the default configuration has not changed from running one of each process.

For more information on the defaults for 9.3, see Primary Server Installation Defaults.

For more information on setting the number of processes for Tableau Server, see Reconfigure Processes.

High Availability Postgres Repository - faster failover

Improvements to the failover process now mean that processes do not need to be restarted after the passive repository is made active. This means that the downtime for a repository failover is significantly reduced.

Distributed installation - manual worker upgrades

Due to an update in third-party software, an upgrade to version 9.3 requires manual upgrade of worker nodes. A prompt during installation of 9.3 will let you know that worker nodes cannot be upgraded automatically. For more information on upgrading, see Perform the Upgrade.

API Server (wgserver) deprecated

The API Server process has been deprecated. In version 9.3, the process is still available in Tableau Server, but it is disabled by default for new installations. The API Server process
was formerly used to support the REST API, but as of version 9.3, this functionality has been moved to the Application Server process. If you explicitly enabled the API Server process in a previous version of Tableau Server, the process will still be enabled in 9.3.

What Changed in Version 9.2

Version 9.2 includes some changes you should know about before upgrading.


The updates to Tableau Server 9.2 have the following impact:

Assign Permissions to Contents setting

Because content permissions can be locked to the project, the Assign Permissions to Contents button has been removed and is no longer available for projects and workbooks. For more information, see Quick Start: Lock Project Permissions and Lock Content Permissions to the Project.

Schedules Run in Parallel by Default

When you create a schedule in Tableau Server, the schedule runs in parallel, that is, it runs on all available backgronder processes at the same time. Schedules finish more quickly when they are run in parallel, but you have the option of running schedules serially as well. For example, you may want to run a very large schedule in serial to allow other schedules to run at the same time. For more information, see Extracts and Refresh Schedules.

What Changed in Version 9.1

Version 9.1 includes some changes you should know about before upgrading.
For information about what's new in Tableau Server 9.1, see the What's New in Tableau Server topic in the Tableau Server online help.

The updates to Tableau Server 9.1 have the following impact:

SAML authentication - logout

Starting with version 9.1, Tableau Server supports SAML logout. SAML logout is enabled by default and you can disable or enable it using the `tabadmin set wgserver.saml.logout.enabled false/true` command.

If your pre-9.1 Tableau Server is configured for SAML authentication, the logout functionality will not work until you reconfigure the metadata for SAML. You must re-export the SAML metadata file and re-import it into your IDP. For more information about configuring SAML metadata, see Configure Server-Wide SAML.

Hidden fields in published data sources - unavailable for workbooks

Starting with version 9.1, workbooks respect hidden fields in published data sources. Prior to 9.1, workbooks using hidden fields automatically exposed these fields.

If a workbook that was created prior to Tableau 9.1 used a published data source with hidden fields, the hidden fields were displayed in the workbook. Starting with Tableau 9.1, the behavior changes:

- If you are creating a new workbook that uses a published data source with hidden fields, those fields remain hidden in the workbook and cannot be used in calculations, sets, groups, and other object creation.

- If you are working with an existing workbook that uses a published data source with hidden fields, those hidden fields are displayed in red in the workbook to indicate that the fields, and therefore the views and calculations that use those fields, are invalid.

You can address this issue in one of two ways, depending on whether you want to show the fields or not:
• Show (unhide) the relevant fields in the data source, and then republish it, or
• Update the relevant workbooks to exclude the hidden fields.

For information on unhiding fields in the Data pane, see Hide or Unhide Fields in the Tableau Desktop help.

Clickjack protection - enabled by default

Starting with version 9.1, clickjack protection is enabled by default on Tableau Server. The protection has been available for several releases, but had been off by default. For more information on clickjack protection and how it impacts embedded views, see Clickjack Protection.

Note: When clickjack protection is enabled, embedded views that use the embed URL copied from the browser address bar might not load. These view URLs usually contain the hash symbol (#) after the server name (for example, http://myserver-#/views/Sales/CommissionModel?:embed=y) are blocked when clickjack protection is enabled on Tableau Server.

What Changed in Version 9.0

Tableau Server 9.0 includes some changes you should know about before upgrading.


The updates to Tableau Server 9.0 have the following impact:
Customizations

Default start page

Any user-defined default start page will be reset to the Tableau Server default start page. Users will need to reset their default start page after the upgrade. For more information about setting a default start page, search for "Manage Your Content Page and Account Settings" in the Tableau Server Help.

Custom logos

Starting with version 9.0, custom logos have changed in the following ways:

- The background for large custom logos is different based on logo location. On the navigation bar the background is black and on the sign-in screen the background is white. For more information, see Change the Name or Logo.
- The small logo option has been deprecated. There are no locations in Tableau Server where the small logo is displayed, so the option does not do anything.

Hardware Requirements (cores, RAM, and free disk space)

Beginning with version 9.0, Tableau Server will not install if your computer does not meet the minimum requirements. This is true for upgrades and new installations, and for all computers in a distributed installation. The hardware requirements are:

- **64-bit Tableau Server**—At minimum you must have 4 cores, 8 GB of RAM, and 15 GB of free disk space to install the 64-bit version of Tableau Server.

- **32-bit Tableau Server**—At minimum you must have 2 cores, 4 GB of RAM, and 15 GB of free disk space to install the 32-bit version of Tableau Server.

For more information, see Minimum Hardware Requirements and Recommendations for Tableau Server.

**Note:** If you are upgrading Tableau Server on a computer that does not meet the minimum hardware requirements, you will not be able to install Tableau Server 10.2.
cannot upgrade 64-bit Tableau Server because of hardware requirements but your computer meets the minimum hardware requirements for 32-bit Tableau Server, you may be able to upgrade to 32-bit Tableau Server.

High availability and failover

As of version 9.0, Tableau Server no longer supports automatic failover with a two-node cluster. To get the benefit of automatic failover, you need to install Tableau Server on a minimum of three nodes. One of these can include a minimal install (the "base install" option).

The option to use an external confirmation host is no longer supported. Any installation that is configured with an external confirmation will be upgraded without that host.

When you upgrade a two-node installation that is configured for high availability (automatic failover), you are given the option to add a third node. You can do so as part of the upgrade process, or at a later time.

The Tableau Software user

Prior to Tableau Server 9.0, if you installed the sample data and users, a user named Tableau Software was created. The Tableau Software user was the owner of the sample data.

Starting with version 9.0, no Tableau Software user is created. If you install the sample data, ownership of that data is assigned to the initial user that is created (the administrator user).

Internal PostgreSQL database password regeneration

Installing Tableau Server or upgrading from a previous version regenerates the password that is used by internal Tableau Server processes for communicating with the PostgreSQL database. This password is only used by internal processes and is not accessible to server administrators or other users. For more information, see Regenerate a Password.
tabadmin restore - Doesn't automatically restart Tableau Server

Starting with version 9.0, a `tabadmin restore` command will not automatically start Tableau Server. If you want the server to start after doing a restore, use the `--restart` option. For more information, see restore.

"Remember me" option

With version 9.0 of Tableau Server, there is no Remember me option on the sign in page.

Session ID in URLs

With version 9.0 of Tableau Server, the session ID at the end of server URLs is now indicated by an "iid" parameter, :iid=<n>. For example, `http://localhost/#/views/Sales2015/SalesMarginsByAreaCode?:iid=1`. This parameter replaces the hash symbol "#<n>" used for the session ID in 8.x versions of Tableau Server.

Changes in view URLs may impact embedded views, API calls, and trusted tickets

In Tableau Server 9.0, view URLs have changed. We recommend that you generate URLs by clicking the Share link in a view in Tableau Server 9.0, and then use the resulting URL in embedded views, API calls, or trusted tickets that you created in Tableau Server prior to version 9.0.

**Note:** If you use view URLs that were created by copying the URL in a browser's address bar rather than using the URL generated by clicking the Share link, the views may not work as expected after you upgrade to version 9.0. This issue can be resolved by replacing the view URL with the Share link URL.
Minimum Hardware Requirements and Recommendations for Tableau Server

The following minimum hardware requirements and recommendations apply to all computers running Tableau Server, including physical hardware and virtual machines (VMs):

- **Minimum requirements** are the minimum hardware your computer must have in order to install Tableau Server. If your computer does not meet these requirements, the Setup program will not install Tableau Server. These requirements are appropriate for testing and prototyping.

- **Minimum recommendations** are higher than minimum requirements, and represent the minimum hardware configuration you should use for a production installation of Tableau Server. If your computer meets the minimum requirements but does not meet these recommendations, the setup program will warn you but you can continue the installation.

In addition, Tableau Server should not be installed on a physical computer or on a VM instance that is also running resource-intensive applications such as databases or application servers.

**Note:** If you install Tableau Server on a computer that meets the minimum requirements but does not have at least 8 cores and 16 GB of system memory, the default number of all processes installed is reduced to one of each process by design. For more information about processes, see Server Process Limits

Minimum Hardware Requirements

The computer on which you are installing or upgrading Tableau Server must meet the minimum hardware requirements. If the setup program determines that your computer does not meet the following requirements, you will not be able to install Tableau Server. For more information on how the Setup program determines hardware, see "Determining Computer Hardware," below.
These minimum requirements are appropriate for a computer that you use for prototyping and testing of Tableau Server. They apply to single-node installations and to each computer in a distributed installation.

<table>
<thead>
<tr>
<th>Minimum Hardware Requirements</th>
<th>CPU</th>
<th>RAM</th>
<th>Free Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-core</td>
<td>8 GB</td>
<td>15 GB</td>
</tr>
</tbody>
</table>

For the requirements:

- Free disk space is calculated after the Tableau Server Setup program is unzipped. The setup program uses about 1 GB of space.

- Core count is based on "physical" cores. Physical cores can represent actual server hardware or cores on a virtual machine (VM). Hyper-threading is ignored for the purposes of counting cores.

**Note:** For Tableau Server 10.2, you need a minimum of 2 physical cores. If you are installing on an Amazon EC2 instance, this means 4 vCPUs. For more information, see Amazon EC2 Instances.

Minimum Hardware Recommendations

For production use, the computer on which you install or upgrade Tableau Server should meet or exceed the minimum hardware recommendations. These recommendations are general. Actual system needs for Tableau Server installations can vary based on many factors, including number of users and the number and size of extracts. If the setup program determines that your computer does not meet the following recommendations, you will get a warning, but you can continue with the setup process.
<table>
<thead>
<tr>
<th>Install Type</th>
<th>Processor</th>
<th>CPU</th>
<th>RAM</th>
<th>Free Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single node</td>
<td>64-bit</td>
<td>8-core, 2.0 GHz or higher</td>
<td>32 GB</td>
<td>50 GB</td>
</tr>
<tr>
<td>Multi-node and enterprise deployments</td>
<td>Contact Tableau for technical guidance. Nodes must meet or exceed the minimum hardware recommendations, except nodes running backgrounder, where 4 cores may be acceptable.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determining Computer Hardware

To determine how many physical cores a computer has, the Tableau Server setup program queries the operating system. To view hardware information that the setup program detected on your computer, open the tabadmin.log file in the following folder on the computer where you are installing Tableau Server:

`<install directory>\ProgramData\Tableau\Tableau Server-\logs\tabadmin.log`

In the `tabadmin.log` file, look for lines similar to the following. These lines provide information about the physical and logical cores that the setup program detected and that it used to determine the core count that is being used for licensing.

```
2015-04-09 14:22:29.533 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Running hardware check
2015-04-09 14:22:29.713 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Detected 12 cores and 34281857024 bytes of memory
2015-04-09 14:22:29.716 -0700_DEBUG_10.36.2.32:<machine name>_:_pid=21488_0x2cd83560__user=___request=___ Hardware meets recommended specifications. Default values will be used.
```
Manually determining the number of cores on your computer

To determine manually how many physical cores your server has, you can use the Windows Management Instrumentation Command-line tool (WMIC). This is useful if you do not know whether your computer will meet the minimum hardware requirements for installing Tableau Server.

1. Open a command prompt.

2. Enter the following command:

   WMIC CPU Get DeviceID,NumberOfCores

   The output will display the device ID or IDs and the number of physical cores the computer has.

   In this example, there are two CPUs, each with six cores, for a total of twelve physical cores. This computer would satisfy the minimum hardware requirements for installing Tableau Server.

   The following command shows a longer version that lists the logical processors as well as the physical cores.

   WMIC CPU Get DeviceID,NumberOfCores,NumberOfLogicalProcessors,SocketDesignation
In the above example, the server has a total of twelve physical cores, resulting in 24 logical cores.

Prepare for the Upgrade

To properly prepare for a Tableau Server upgrade, gather information about your existing installation, key files related to your installation and the upgrade, and complete the pre-upgrade tasks.

Gather information and required files

Credentials

You will need the following credentials in order to upgrade and configure Tableau Server:

- Credentials for a Windows user account that has administrative access on the Tableau Server computer. You need these credentials in order to run the setup program for upgrading and to run `tabadmin`. You also need administrative credentials for worker node computers if your upgrade requires you to upgrade the workers manually.

- Credentials for the Run As User account on the Tableau Server computer.

Custom configuration information

If you are upgrading on the existing hardware your configuration will be preserved, but it's a good practice to collect this configuration information about your existing installation for several reasons: you need this information when you configure a test environment, you need
this information if you are migrating to new hardware migration as part of the upgrade, and you can use the information to confirm that the upgraded Tableau Server is configured as expected if you notice something unexpected after upgrading.

Collect this information and any associated files and save them to a location that is not on any of the Tableau Server computers.

The following list includes examples of the type of information you should gather:

- **Customizations** This includes non-default ports, timeout values, custom logo images, and fonts. Also make a note of Windows path environment variables that affect Tableau Server.

- **SMTP** configuration. You can see your current SMTP configuration on the SMTP Setup tab of the Configuration utility. For more information, see Configure SMTP Setup.

- **SSL** configuration and certificates. You can see your SSL configuration on the SSL tab of the Configuration utility. This tab also lists the location of the certificate and certificate key files. You should copy and save these files in a safe location. For more information, see Configure External SSL.

- **SAML** configuration, certificates and any IdP metadata files. You can view your current SAML configuration on the SAML tab of the Configuration utility, including the certificate, key, and metadata files. Save copies of these files to a safe location. For more information, see Configure SMTP Setup.

- **Kerberos** configuration. You can see your current Kerberos configuration on the Kerberos tab of the Configuration utility, including the location of the keytab file you should copy and save. For more information, see Configure Kerberos.

- **OpenID** configuration. Find your current OpenID configuration details on the OpenID tab of the Configuration utility. For more information, see Configure Tableau Server for OpenID Connect.

- **Worker** configurations. Collect the configurations of your worker nodes, including any
certificates or other supporting files that you have needed to copy to the worker nodes. You can find detailed information about the number of processes configured on each node on the Servers tab of the Configuration utility. See Reconfigure Processes for more information.

- **Other** values. Note the number of projects, groups, workbooks, views, data sources, and users you have in your production environment. Having this information makes it easy to do a quick check after the upgrade to make sure everything was restored as expected.

Environment configuration

The steps you need to take during the upgrade process depends on whether you’re installing the upgrade on the same hardware or you’re migrating to new hardware. Upgrading on the same hardware is straightforward and requires a minimum of manual steps (the steps you need to take depend on what version you are upgrading from, what version you are migrating to, and whether or not your existing installation is in the default location). Migrating to new hardware requires you to manually restore your Tableau Server data and reconfigure your settings after you install the new version.

Install location

**By default Tableau installs to** C:\Program Files\Tableau\Tableau Server. If your current Tableau Server installation is to a non-default path, you need to note the current location in case you are prompted to provide it during upgrade. Depending on your existing version and the version you are upgrading to, the setup program may not find your existing data and configuration unless you specify it.

Setup files

You will need the following setup files before you upgrade Tableau Server:

- The setup program for your existing version of Tableau Server; if you are upgrading a distributed installation, the Tableau Worker Software setup program.
You might not need these. However, we recommend that you have them available in case there’s a problem during the upgrade. That way you can use these and your server backup to restore your installation to its pre-upgrade state.

**Note:** If you do not have the install program for your existing version, you can download it from the Alternate Downloads Site. If you have a distributed installation of Tableau Server, you should also download the corresponding installer for worker nodes. Save the setup programs in a safe location that is not part of your production or test version of Tableau Server. You will need these if you need to go back to your existing version after upgrading.

- The setup program for the new version of Tableau Server, including the Worker Software Setup program, if you are upgrading a distributed installation.

**tabcmd**

A new version of tabcmd is released with every release of Tableau Server. If you install tabcmd on computers that are not part of your Tableau Server installation, you need to update tabcmd on those computers. The latest version of tabcmd is installed in the `extras` folder when you upgrade Tableau Server. For more information, see tabcmd.

**Pre-Upgrade Tasks**

Perform these tasks before starting your upgrade.

**Back up Tableau Server data**

We recommend that you make a backup of your installation of Tableau Server before beginning the upgrade process. This provides data that you'll need to set up a test version of the upgraded environment. It also lets you recover if the upgrade process fails.

**Note:** We recommend you disable subscriptions and scheduling in your production environment immediately before taking the backup, and reenable them after the backup.
is complete. Doing this will help avoid having your users receive duplicate subscriptions and email messages when you restore your backup in your test environment.

If you already have a backup that lets you restore the current state of the server, you can skip this step.

1. On the Tableau Server computer, open a command window as an administrator.

2. Change to the \bin folder where the tabadmin.exe file is. For example to change the \bin directory in a default installation:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\version\bin"
   ```

3. Type the following command to remove unneeded files from the server:

   ```
   tabadmin cleanup
   ```

4. Type the following command to back up the server, substituting your own path and file-name for myserver.tsbak:

   ```
   tabadmin backup myserver.tsbak
   ```

   If you're running Tableau Server version 9.3 or later, run the backup command using the --verify option to verify the backup:

   ```
   tabadmin backup --verify myserver.tsbak
   ```

   For more information, see Remove Unneeded Files and Back Up Tableau Server Data.

Check your product maintenance status

If you attempt to upgrade a Tableau Server installation that has a product key with expired maintenance, your upgraded Tableau Server will be unlicensed. Before upgrading, make sure that the server's maintenance hasn't expired.
1. In Windows, select **Start > All Programs > Tableau Server > Manage Product Keys**.

2. In the Manage Product Keys dialog box, look for the expiration date under the **Maintenance Expires** column.

   ![Manage Product Keys](image.png)

   If your maintenance has expired, select the product key and then click **Refresh**. If the maintenance date isn't updated, contact **Tableau Technical Support**. Reactivating the product key will be part of the upgrade process.

   For more information, see Activate Tableau Server. If your server doesn't have internet access, see Activate Tableau Server Offline.

**Test the Upgrade**

The best way to learn what impact a Tableau Server upgrade will have to your current environment is to test it. Knowing how an upgrade will affect your users and your server helps you plan and communicate before the actual upgrade, ensuring that your users will not be caught by surprise.

If you have a Tableau Server test environment this is a great place to test out the upgrade.

We recommend the following sequence for testing a Tableau Server upgrade:

1. **Prepare a test environment**

2. **Upgrade the test environment**
3. Confirm that existing functionality works

4. Test new features

Prepare a test environment

To start, create a test environment that mirrors your production environment as closely as possible. The closer your test environment is to the actual environment you will be upgrading, the more accurate a representation you will have of how the upgrade will impact you. This includes identical or similar hardware and operating systems, as well as the same authentication options and network access.

When you've got a test computer or virtual machine ready, follow these steps for creating a test environment.

**Note:** To perform these steps, you must be signed into the Tableau Server computer as a Windows administrator. This applies both to the existing server and to the test server environment.

1. On the existing production environment, create a backup of Tableau Server using the `tabadmin backup` command. If you're using version 9.3 or later, include the `--verify` option.

   For more information, see Creating a pre-upgrade backup.

2. On your test environment, install a copy of the same version of Tableau Server as you have in your production environment.

   **Note:** You can download the setup program for your current version (and the Worker Setup Program for nodes in a cluster) from the Alternate Downloads Site.

3. Restore your existing database *without* configuration data using the `tabadmin`
The `restore` command and the `--no-config` option.

You don’t want the existing configuration data because your test server will have different IP addresses, and you don’t want the test environment to conflict with the existing server.

For more information, see Restore from a Backup.

If you are not the administrator of the production Tableau Server installation and do not have those credentials, you might need to reset the Tableau Server administrator password using the `tabadmin reset` command.

4. Manually replicate your existing Tableau Server configuration.

You need to manually configure certain aspects of your environment because you restore the Tableau database using the `--no config` option. You also need to manually configure some customizations.

Upgrade the test environment

Follow the appropriate steps for upgrading the test environment, depending on your configuration:

- Upgrade a Single-Node Tableau Server
- Upgrade a Multi-Node (Distributed) Tableau Server

Confirm that everything works as expected

After you have the new version of Tableau Server installed and configured in your test environment, you are ready to test. You should test basic functionality, along with any special aspects of server that your organization relies on. For example, if there are key subscriptions that your organization relies on, make sure that you test those.

These are some areas of testing to consider:
• **Server processes.** Sign in to Tableau Server as a server administrator, and then open the Server Status page to confirm that all services and processes are running as expected (including on all worker nodes if this is a distributed installation).

• **User access.** Confirm that Tableau Server users can sign in. Test your normal user sign in process. Have some of your users participate in the testing to make sure they are able to sign in as expected, and that they can get to the same content that they have access to in your production environment.

• **Publishing workbooks and data sources.** Have users publish workbooks and data sources from Tableau Desktop to make sure this goes as you expect.

• **Viewing published workbooks.** Have users who are familiar with the content try to view published workbooks to make sure they appear as expected. Test views embedded in web pages (for example, in SharePoint pages).

• **Subscriptions and extract refreshes.** Manually run some extract refreshes to confirm that they complete successfully. Run some key scheduled extract refreshes to confirm that they complete as expected.

• **Permissions.** Confirm that permissions are still set as expected for users and content.

• **Command-line utilities and APIs.** If applicable, test the command line utilities (tabadmin and tabcmd) and programmatic access via APIs.

**Test new features**

Take a look at the new features that come with the version you are upgrading to, and at any features that were added between the version you currently have and the new version. Think about how to help your users understand the benefits of the features that apply to your environment.

For more information on new features, see What’s New in the Tableau Server Help.
Communicate about the upgrade

The best way to make an upgrade go smoothly is by letting your organization know ahead of time about the upgrade and how it might impact them. If you’ve had users help test, take advantage of their experience by having them help communicate the changes they saw while testing. You can also provide user access to the test environment if there are key people who should see the upgraded version before the actual upgrade.

Perform the Upgrade

After you’ve completed the Prepare for the Upgrade, upgrade your existing Tableau Server installation to version 10.2 by following one of the topics listed at the bottom of this page. (If you are migrating to new hardware as part of your upgrade, refer to Migrate to New Hardware instead.)

When you install the newer version of Tableau Server, use the same drive and directory that the earlier version used. This way, data and configuration settings from your earlier version can be automatically imported. If your installation location is not the default, see Upgrade Tableau Server to a Non-Default Location.

Before upgrading, read through the list of pre-upgrade tasks to make sure you have followed the recommended best practices. For details, see Prepare for the Upgrade.

If you are upgrading from 32-bit Tableau Server to 64-bit Tableau Server you must uninstall your existing version before installing the new version. For more information, see Upgrade from 32-bit to 64-bit Tableau Server.

As a best practice, you should always make a backup of your Tableau Server data before upgrading. This backup is necessary in the event that something unexpected happens during the upgrade, or if you need to roll back to your previous version of Tableau Server. If you create this backup yourself, you can do it while Tableau Server is running. If you are upgrading to version 10.0 or later you can choose to have the Setup program create the backup while upgrading Tableau Server, but the backup is created while the server is stopped so this extends the length of time the server is unavailable. For more information, see Prepare
for the Upgrade, Tableau Server Upgrade Backup Options, and Back Up Tableau Server Data.

Upgrade a Single-Node Tableau Server

The instructions in this topic explain how to perform a Tableau Server upgrade on a single-node server, without changing the hardware or other configuration as part of the upgrade. If this is not your situation, see the following topics for instructions:

- If you are upgrading a distributed (multi-node) Tableau Server installation, see Upgrade a Multi-Node (Distributed) Tableau Server.

- If you are upgrading to a non-default location, see Upgrade Tableau Server to a Non-Default Location.

- If you are upgrading to new hardware, see Migrate to New Hardware.

- If you are upgrading from a 32-bit version of Tableau Server to a 64-bit version, see Upgrade from 32-bit to 64-bit Tableau Server.

Before you upgrade

Make sure you’ve prepared for the upgrade by reviewing changes in the new version and by gathering required information. For more information, see Research the Upgrade and Prepare for the Upgrade. Also make sure you’ve downloaded the Tableau Server setup program for the primary server node from the download site. Optionally (but recommended), test the upgrade on a test environment that mimics your production environment. For more information, see Test the Upgrade.

Perform the upgrade

1. Run the Tableau Server setup program on the Tableau Server computer.

   The setup program will determine that you have a previous version installed and prompt you for a backup option.

2. Specify whether you want the setup program to perform a full backup before it
uninstalls the existing version. This backup is only needed if something unexpected happens during the upgrade. The server will be unavailable while the backup is being created. If you have a recent backup you can choose the option to not do the full backup. For more information, see Tableau Server Upgrade Backup Options.

3. After uninstalling the existing version (and creating a backup, if you selected that option), the installation process prompts you for an install location. If you are upgrading a version that was installed to the default location, you can accept the default. If you are upgrading an installation that was installed to a non-default location, navigate to the original location.

If you do not navigate to the original location, your data and configuration settings from the original installation will not be found and used for your upgraded installation.

**Note:** If you are upgrading from a version of Tableau Server that is earlier than 9.x, your existing extracts will be migrated to the new File Store during upgrade. This process may take a long time (up to several hours if you have a large number of extracts or extracts that are large in size). While this takes place a message displays: "**Migrating extracts to File Store This process may take up to several hours.**" For more information, see Troubleshoot Tableau Server Install and Upgrade

**Upgrade a Multi-Node (Distributed) Tableau Server**

In a multi-node (distributed) installation of Tableau Server, you need to upgrade all the nodes (primary and all workers) so they are running the same version of Tableau.

Start by upgrading the primary node. For some upgrade paths (for example, from version 9.3 to version 10.0), the upgrade process will automatically push an upgrade from the primary node to the worker nodes. If the workers cannot be automatically upgraded, usually when the upgrade includes updates to PostgreSQL drivers or other third-party software, the Setup program will let you know that you must manually upgrade the worker nodes.
**Important:** You should not upgrade a worker node before upgrading the primary node. Start the upgrade on the primary node, and if prompted by the setup process, move to the worker nodes and manually upgrade them before returning to the primary node to complete the upgrade. If you upgrade a worker node before upgrading the primary node, you will need to completely uninstall Tableau Server, reinstall, and restore from your backup.

- If you are upgrading to a non-default location, see Upgrade Tableau Server to a Non-Default Location.

- If you are upgrading to new hardware, see Migrate to New Hardware.

- If you are upgrading from a 32-bit version of Tableau Server to a 64-bit version, see Upgrade from 32-bit to 64-bit Tableau Server.

Upgrading a high availability installation of Tableau Server requires some additional steps to upgrade the backup primary, as explained later in this topic.

Before you upgrade

Make sure you’ve prepared for the upgrade by reviewing changes in the new version and by gathering required information. For more information, see Research the Upgrade and Prepare for the Upgrade. Also make sure you've downloaded the Tableau Server setup program and Worker Software setup program from the download site. Be sure to download the same version for both primary and workers. You will need the worker software if it turns out you must manually upgrade worker nodes. Optionally (but recommended), test the upgrade on a test environment that mimics your production environment. For more information, see Test the Upgrade.
Upgrade the primary node and worker nodes

1. Run the Tableau Server setup program on the primary server node.

   The setup process will determine that you have a previous version installed and prompt you for a backup option.

2. Specify whether you want the setup program perform a full backup before it uninstalls the existing version. This backup is only needed if something unexpected happens during the upgrade. The server will be unavailable while the backup is being created. If you have a recent backup you can choose the option to not do the full backup. For more information, see Tableau Server Upgrade Backup Options.

3. After uninstalling the existing version (and creating a backup, if you selected that option), the installation process prompts you for an install location. If you are upgrading a version that was installed to the default location, you can accept the default. If you are upgrading an installation that was installed to a non-default location, navigate to the original location.

   If you do not navigate to the original location, your data and configuration settings from the original installation will not be found and used for your upgraded installation.

4. With most upgrades, the worker nodes will be automatically updated.

   Note: When worker nodes are upgraded automatically, the Windows registry on the worker nodes will not reflect the upgrade, so the old version will still show in the program list of Control Panel. This is expected.

   If the upgrade process requires you to upgrade the worker nodes manually, you will be prompted during installation of the primary with a message: "One or more workers could not be upgraded automatically."
a. If you see this message, sign in to each worker node and run the Tableau Worker setup program.

b. Setup uninstalls the existing version of the worker node software and installs the new version.

c. Return to the primary server.

5. Follow the prompts in the Setup program to complete the installation.

**Note:** If you are upgrading from a version of Tableau Server earlier than 9.x, your existing extracts will be migrated to the new File Store during upgrade. This process may take a long time (up to several hours if you have a large number of extracts or extracts that are large in size). While this takes place a message displays: "**Migrating extracts to File Store This process may take up to several hours.**" For more information, see Troubleshoot Tableau Server Install and Upgrade.

If you are upgrading a distributed installation that includes a backup primary, you need to upgrade the backup primary in a separate step, after upgrading the rest of the cluster.

Upgrade a backup primary server

If you have configured your Tableau Server installation for high availability, after you've finished the upgrade for the primary node and the worker nodes, upgrade the backup primary computer.

1. On the backup primary, run the Tableau Server Setup program.

   Setup will determine that you have a previous version installed and prompt you for a backup option. Choose to not create a backup.

2. If you changed hardware or any configuration values on the primary or worker nodes
during the upgrade, reconfigure the backup primary by following the instructions in Create a Backup Primary.

Tableau Server Upgrade Backup Options

When you upgrade Tableau Server, the setup program can make a backup as part of the upgrade process. This can be helpful in case something unexpected happens while you are upgrading, or if you need to go back to your previous version.

**Note:** Beginning with version 10.0 of Tableau Server, the Setup program gives you the option to skip making a full backup.

You might choose instead to create a backup before you start the upgrade process and then skip the backup during the upgrade. This lets you create a backup while Tableau Server is running and available to your users. If the backup occurs during the setup process, the server is stopped, and it increases the length of time your users cannot access their Tableau content.

For more information on backing up Tableau Server, see Back Up Tableau Server Data. For more information about restoring a backup, see Restore from a Backup.

If the setup process detects an existing installation of Tableau Server, it offers you the following options:

- **Full backup.** When you select this option, the setup process performs a complete backup of your Tableau data and configuration before it uninstalls the existing version.

  Choose this option if you haven't recently made a backup and it is acceptable for Tableau Server to be unavailable to your users during the backup. A full backup can take a significant amount of time—up to several hours if you have a large installation or a lot of stored data (extracts). Because the server is unavailable during the period the backup is being created, choose this option only if you do not already have an up-to-date backup.
• **Without full backup.** When you select this option, the upgrade process uninstalls the previous version without making a backup.

Choose this option only if you have a recent backup. This option can save you a significant amount of time during the upgrade (for data-heavy installations, you can save hours).

**Note:** Any changes made between the time you took the backup and the time you do the upgrade are lost because they aren’t included in the backup.

### Special Installation Scenarios

The bulk of the upgrade instructions cover typical upgrade situations. Not everyone is doing a straightforward or default upgrade, and the following topics cover some of the most common non-standard situations.

### Upgrade from 32-bit to 64-bit Tableau Server

Starting with version 10.0, Tableau Server is available only as a 64-bit application. In previous versions, it was also available as a 32-bit application.

A distributed installation of Tableau Server must run the same bit version (all 32-bit or all 64-bit) and release version (10.0 for example) on all nodes. When you upgrade a distributed installation of Tableau Server to the 64-bit version, you need to manually upgrade each worker node by uninstalling the 32-bit version on each worker before you install the 64-bit version of the worker software.
1. Uninstall the 32-bit version on your primary Tableau Server computer.

   **Note:** Uninstalling removes the server software but leaves your data and configuration settings intact. If your existing 32-bit version was installed to the default location (C:\Program Files (x86)\Tableau\Tableau Server-\<version>) the 64-bit Setup program will find the data and configuration and use it in the upgraded installation. If your existing 32-bit version was installed to a non-default location, see Upgrade Tableau Server to a Non-Default Location.

2. Install 64-bit Tableau Server on the primary Tableau Server node.

3. Uninstall the 32-bit version on each worker node.

4. Install 64-bit Tableau Server Worker software on each worker node.

5. Return to the primary server and complete the configuration of 64-bit Tableau Server.

**Upgrade Tableau Server to a Non-Default Location**

You need to install Tableau Server to the same location as your existing Tableau Server so the setup process can locate and upgrade the existing configuration and data.

By default, the Tableau Server setup program installs Tableau Server in the following location:

C:\Program Files\Tableau\Tableau Server\version

and stores data and logs in this location:

C:\ProgramData\Tableau\Tableau Server

If your existing installation is in the default location, you can accept the defaults in the Setup program, and the install process finds your associated data and configuration settings during upgrade.
If your existing installation is not in the default location, you need to tell the Setup program where to install the new version of Tableau Server. How you specify a non-default upgrade location when prompted by the Setup program depends on whether you browse to the location or type the path.

- **If you browse to the install location**, the Setup program takes that path and appends `\Tableau Server` to it, and then installs to a `<version>` folder immediately below the `\Tableau Server` folder. You can see the path that Tableau Server will be installed to when you are browsing, and you can edit that path if it is not correct (if, for example, you do not have a `\Tableau Server` folder).

- **If you type the install location**, the Setup program accepts the path you type and installs to a `<version>` folder at the end of that path.

Don't include the `<version>` folder when browsing or typing the path.

For example, to upgrade an existing 10.0 Tableau Server installed to `D:\Tableau\10.0`, you can either

- Browse to `D:` (the Setup program will populate the path as `D:\Tableau Server`) and edit the path so it reads `D:\Tableau`

  or

- Type the path as `D:\Tableau`

**Migrate to New Hardware**

Use the following procedure to migrate Tableau Server from one computer to another. Specifically, these steps describe how to move Tableau Server data and configuration settings from your in-production computer to a new computer where Tableau Server is installed. Before you start, make sure you have followed the steps in Prepare for the Upgrade, including creating a backup. The backup is what you use to restore your Tableau Server data.
1. Install Tableau Server on the new computer. For details, see Run Server Setup.

2. Copy your backup file .tsbak to the bin folder on your new Tableau Server (for example, C:\Program Files\Tableau\Tableau Server-\<version>\bin).

   **Note:** The file does not need to be in the bin directory but if it is not, you will need to include a full path to the file when you run the restore command.

3. Next, stop Tableau Server.

4. Restore your in-production data without configuration information to your new Tableau Server installation using the `tabadmin restore` command:

   ```
   tabadmin restore --no-config <filename>
   ```

   where `<filename>` is the name of the .tsbak file. For example:

   ```
   tabadmin restore --no-config mybackup.tsbak
   ```

   The `--no-config` option restores the data from your in-production Tableau Server but excludes configuration information. You need to use this option when moving to new hardware to avoid conflicts with the old configuration. After doing the restore, you may need to reconfigure some options (SMTP or proxy settings, for example).

   For more information about restoring Tableau Server data, see Restore from a Backup.

5. Start the server.

6. **Distributed installations only:** Run the Tableau worker installer on the new worker computers you want to add to your new Tableau Server cluster. See Install and Configure Worker Nodes for steps.

7. The same Tableau Server product key can be activated three times: once for a
production environment, once for a test environment, and once for a QA environment. After you have tested your new Tableau Server installation and confirmed that it’s ready for production, you must deactivate your earlier production version of Tableau Server, and then you must uninstall it. To deactivate the earlier version:

a. Select **Start > All Programs > Tableau Server > Manage Product Keys**.

b. For each product key, select the product key and click **Deactivate**.

**Note:** If you do not have an internet connection, you are prompted to create an offline activation file to complete the deactivation process. See Activate Tableau Server Offline for steps.

**Troubleshoot Tableau Server Install and Upgrade**

Follow the suggestions in this topic to resolve common issues with Tableau Server. For additional troubleshooting steps based on process status viewed on the Status page, see Troubleshoot Server Processes.

**General Troubleshooting Steps**

Many Tableau Server issues can be addressed with some basic steps:

1. Make sure there is enough disk space on each computer running Tableau Server. Limited disk space can cause a failure to install, a failure to upgrade, or problems running Tableau Server.

2. Restart Tableau Server. Issues related to indexing and processes not fully started can be resolved by restarting Tableau Server in a controlled way. To restart Tableau Server, use the `tabadmin restart` command. This will stop all the processes associated with Tableau Server and then restart them.

3. Clean up files associated with the Coordination Service (ZooKeeper). To clean up
Coordination Service files, use the `tabadmin cleanup --reset-coordination` command.

Starting Tableau Server

Tableau Server cannot determine if it fully started

In some instances Tableau Server may report that it could not determine if all components started properly on startup. A message displays: "Unable to determine if all components of the service started properly."

If you see this message after starting, verify that Tableau Server is running as expected by using a `tabadmin status -v` command.

If the status shows as running ("Status: RUNNING"), then the server successfully started and you can ignore the message. If the status is DEGRADED or STOPPED, see "Tableau Server doesn't start" in the next section.

Tableau Server doesn't start

If Tableau Server does not start or is running in a degraded state, run the `tabadmin restart` command from a command prompt. This will shut down any processes that are running, and restart Tableau Server.

Installing Tableau Server

Install fails due to hardware requirements

Starting with version 9.0, Tableau Server cannot install if the computer you are installing on does not meet the minimum hardware requirements. The requirements apply to both primary server computers and worker computers. For details on minimum hardware requirements, see Minimum Hardware Requirements and Recommendations for Tableau Server.
Install or upgrade generates an error when PostgreSQL ODBC driver does not install correctly.

In certain circumstances (when a system reboot is pending, or another program is being installed or updated, the Tableau Server PostgreSQL ODBC driver does not install correctly. When this happens, this message displays:

PostgreSQL ODBC driver (64-bit) version 09.03.0400 did not install properly.

**Note:** The version may be different, depending on what version of Tableau Server you are installing.

If this occurs, follow these steps to correct the issue:

1. Check to see if the driver shows as installed in Control Panel.
2. If the driver is not installed, download it from the Tableau Drivers page and install it.
3. If the driver is installed, uninstall it from Control Panel, restart the computer, download the driver, and install it again.

**Upgrading Tableau Server**

*Extract migration is slow*

Tableau Server 9.0 introduced a more reliable storage mechanism for data extracts called the File Store. Upgrading from a previous version requires migration of the extracts. This can take a long time (up to several hours) if you have a large number of extracts or extracts that have a lot of data. During migration a message displays:

Migrating extracts to File Store
This process may take up to several hours.

If the migration progress appears to be stalled or stuck, you can verify that migration is continuing by watching the `tabadmin.log`. An entry is written to this log for each extract that
is migrated. You can periodically copy the log and open your copy in a text editor like Note-pad to verify that entries are being written to it.

Upgrading fails due to lack of disk space

If there is not enough disk space for the Tableau Server Setup program to run and do the upgrade, the installation will fail. The amount of disk space required will depend on the size of your repository database and the number and size of your extracts. As a part of upgrading to version 9.0, the Setup program migrates extracts to the new File Store and this takes space.

To free up disk space:

1. Zip and save logs using the `tabadmin ziplogs` command.

   After you create the ziplogs file, save it to a safe location that is not part of your Tableau Server installation.

2. Clean up unnecessary files using the `tabadmin cleanup` command. For more information, see Remove Unneeded Files

Reindexing Tableau Server Search & Browse

Problems that can be solved by reindexing Search & Browse

Symptoms of an index that needs to be rebuilt include:

- A blank list of sites when a user attempts to log in
- A blank list of projects when a user tries to select a project
- Missing content (workbooks, views, dashboards)
- Unexpected or inaccurate alerts (for example, an "refresh failed" alert on a workbook that does not include an extract)

If you see any of these behaviors, rebuild the Search & Browse index using the `tabadmin reindex` command.
Activating Tableau Server

Tableau Server license activation fails

In some instances Tableau Server license activation may fail with one of the following error messages:

- Function flxActCommonLicSpcPopulateFromTS returned error 50030, 71521,
- No license found for 'Tableau Server'

To resolve this issue, try these solutions in the order listed:

Confirm you can access the licensing server

The Tableau licensing service was moved to a new data center on October 6, 2018. This means any environments that required special configuration (static IP safe listing for example) to access licensing.tableau.com or licensing.tableausoftware.com will need to be updated before you can activate, refresh, or deactivate a Tableau product key.

Tableau Server needs to connection to the following internet locations for licensing purposes:

- licensing.tableau.com:443
- o.ss2.us
- ocsp.rootg2.amazontrust.com
- ocsp.rootca1.amazontrust.com
- ocsp.sca1b.amazontrust.com
- crt.sca1b.amazontrust.com
- crt.rootca1.amazontrust.com
- ocsp.sca0a.amazontrust.com
Requests to the above domains may be on port 80 or 443.

Verify the date and time

Verify the date and time on the primary Tableau Server computer is correct. If the clock is set to a time and date earlier than the current date, Tableau Server cannot be activated.

Verify FlexNet Licensing Service has started

If the date and time on the Tableau Server computer are correct, verify that the FlexNet Licensing Service is running on the primary Tableau Server computer.

1. On the primary computer, from the Windows Start menu, open services.msc.

2. In the Services dialog box, verify that the status of FlexNet Licensing Service 64 (64-bit) or FlexNet Licensing Service (32-bit) is Started.

   If FlexNet is not listed as Started, right-click FlexNet Licensing Service and select Start.
If the **Start** option is grayed out, the service may be set to Disabled. To enable the service:

a. Right-click FlexNet Licensing Service and select **Properties**.

b. From the **Startup type** drop-down list, select **Automatic**.

c. Click the **Start** button, and then click **OK**.

**Force the product key to be read again**

1. On the primary Tableau Server computer, sign in as administrator and open a command prompt.

2. Change to the Tableau Server bin directory. By default this is:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

3. Type the following commands:

   ```
   tabadmin stop
   lmreread
   tabadmin start
   ```

**Send the contents of trusted storage to Tableau Support**

If FlexNet Licensing Services is installed and running but you’re still seeing an error, there might be a problem with the Tableau product key information. To resolve this issue, complete the following steps to create a file of the key information located in trusted storage.

1. On the primary Tableau Server computer, sign in as administrator and open a command prompt.

2. Change to the Tableau Server bin directory. By default this is:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

3. Type the following command:
serveractutil -view > LicResults.txt

4. Contact Customer Support (http://www.tableau.com/support/request) and include the LicResults.txt file that you created.

Distributed Environments

Quick Start: Distributed Server

Increase the scalability of your Tableau Server environment by distributing the server components across several machines. Install Tableau Server on your primary node, then use the Worker Installer to install the software onto one or more “worker” nodes. With the worker nodes installed, configure the primary node to use those workers.

1 Install Tableau Server on Worker Nodes

Download the Tableau Server Worker installer from the download site and install it on all of the computers (other than the primary server) that you want to include in the distributed installation of Tableau Server. Be sure to download the same version of the worker software that you installed on the primary node.

Install Tableau Server on the primary node before you install on the other nodes in the distributed installation.

2 Open Configuration Utility

On your primary node, open the configuration utility by selecting Tableau Server 10.2 > Configure Tableau Server.
3 Add Worker Nodes

In the Configuration Utility, select the **Servers** tab and click **Add**. In the Add Tableau Server dialog box, type the IP address or the name of the worker node in the **Computer** box and
specify the number of processes to allocate to the node. Repeat this for each machine you want to include in the distributed installation.

You can click Discover to automatically add any worker computers you installed in step 1 above.

4 Configure & Update Primary Node

After you set up the worker nodes, make all configuration changes and updates on the primary node. Use the command line tools and the Tableau Server Configuration utility on the primary node. Updates will be pushed to the workers automatically.

Distributed Requirements

Before you start to configure a Tableau Server cluster, make sure you meet the following requirements.

Hardware

While the computers you use in your cluster must meet the requirements described in Before you install..., they do not need to be identical.

Hardware Guidelines for High Availability

Here are some guidelines for the systems you use for failover and high availability:

- **Failover—three computers**: To configure a cluster that provides failover support for the data engine and repository processes, you need at least three computers or VMs: one for the primary Tableau Server and two for Tableau worker nodes.
**Note**: If you install Tableau Server on a two-node cluster, a message displays to let you know that you are limited to one instance of the repository, and that high availability and failover are not available in a two-node configuration. You can add a third node but are not required to do so. In a two-node cluster, if one of the two nodes goes down, Tableau Server may not function correctly.

- **Failover & multiple gateway support—three computers and a load balancer**: To configure a cluster that provides the above plus support for multiple gateways, you need at least three computers or VMs, and a load balancer to front the cluster.

- **High availability—four computers and a load balancer**: To configure for high availability, you need the resources described above plus an additional computer to be the backup primary for your primary Tableau Server.

- **Primary computers**: If you configure for high availability, the primary Tableau Server and the backup primary may be running few or no Tableau Server processes. Therefore, the computers that run the primary and backup primary do not need as many cores as the ones running your worker servers. You will, however, need adequate disk space for backups because the primary computer is used during the database backup and restore processes. In addition to the amount of space needed for the backup file, you need temporary disk space roughly 10 times the size of the backup file (so if your backup is 4 GB, you should have about 40 GB of temporary disk space available).

**Software**

As of version 10.0, Tableau Server is only available in a 64-bit version.

Earlier versions were offered in both 32-bit and 64-bit versions. If you are running a version of Tableau Server that was available in both 32-bit and 64-bit, be aware that each computer must run the bit version—either all 64-bit or all 32-bit. For example, if the primary Tableau Server is running the 64-bit version of Tableau Server, the workers in the cluster must run the 64-bit version of Tableau Server Worker.
Networking and Ports

- **Ports**: As with any distributed system, the computers or VMs you use need to be able to communicate with one another. See Tableau Server Ports for a list of ports that must be available on the gateways and workers.

- **Same domain**: If Tableau Server is installed in a Windows Active Directory environment, then all computers in a cluster must be members of the same domain.

- **Same subnet**: Do not install a distributed system across multiple subnets. Each node in the cluster must be installed on the same subnet.

- **Service account**: The server's Run As User account, which is specified on the primary Tableau Server, must be the same on each computer in the cluster. If you are not running in an Active Directory environment, then we recommend updating the Run As User with a Windows workgroup user. You must specify the same user account and password on each node in the cluster. While you can leave the default NetworkServices account on each node in the cluster, we do not recommend this as a best security practice.

- **Static IP addresses**: Any computer running Tableau Server, whether it's a single server installation or part of a cluster, must have a static IP address (learn more).

- **Discoverable**: Each node in the cluster must be discoverable from other node computers using DNS or a local host file.

Best Practices

Here are some things to keep in mind before you start to install and configure:

- **IP addresses or computer names**: Note the IPv4 addresses or computer names of each computer or VM you’ll be working with. You will need to provide them during Tableau Worker Setup and configuration. As mentioned above, each computer in the cluster must use a static IP address, even if you use the computer’s name to identify it during configuration.
• **CNAME record**: If you’re configuring for high availability and you are not using a load balancer, make sure your primary Tableau Server and backup primary have the same CNAME record so that your Tableau Server users have a smooth experience if one primary fails and you configure the other to take over. If you are using a load balancer, it’s the load balancer’s name that users will be using as the Tableau Server URL, regardless of the gateway that’s actually handling the request.

• **User account credentials**: For each computer, you need credentials for a user account with local admin permissions. If you’re configuring for high availability, the Run As account you use for your primary Tableau Server must be the same as the one you use for your backup primary Tableau Server.

• **Backup**: It’s a best practice to create a backup prior to making significant system changes. See Back Up Tableau Server Data for steps.

**SSL**

If you are planning to configure SSL for a highly available Tableau Server cluster with multiple gateways and a load balancer (learn more), make sure that the SSL certificate you use was issued for the load balancer’s host name. See Configure SSL for a Cluster for other details.

**Install and Configure Worker Nodes**

After you complete the initial configuration, you can set up Tableau Server to run on multiple computers. This is called a distributed installation, or cluster.

Running a distributed installation uses additional ports on the primary Tableau Server and requires that certain ports be available for binding during Setup on the Tableau Worker Servers. See Tableau Server Ports for more information. There are also additional requirements to be aware of when you run a distributed installation. See Distributed Requirements for details.
**Note:** If you install Tableau Server on a two-node cluster (the primary and one worker) with a data engine/file store on each node, a warning displays to let you know that you will not have failover support with this configuration and asking if you want to add a third node. You are not required to add a third server to the cluster, but with a two-node cluster there is no failover support, and if one of the two nodes goes down, Tableau Server will shut down. You cannot install multiple instances of the repository in a two-node cluster. For more information, see Two-node installations are limited to a single instance of the repository.

To install Tableau Server worker nodes:

1. Make sure you've installed Tableau Server on the primary computer.

2. Stop Tableau Server on the primary node (see Tableau Server Monitor to learn how).

3. Download the Tableau Server Worker software from the Tableau Customer Account Center.

4. Run Tableau Server Worker Setup on each computer you want to add to the Tableau Server cluster.

5. During installation you will be asked to provide the IPv4 addresses or computer name of the primary server. Using a computer name is recommended.

If the primary has multiple network interface cards (NICs) enabled and you choose to enter IPv4 addresses, enter all of the primary’s IPv4 addresses, separating each with a comma. The IP address(es) for the computer running the primary must be static, this applies even if you use a computer name to identify the primary (learn more).

If you have a worker running Windows 7 with Windows Firewall enabled, you may get an error ("Worker is not responding") when you attempt to add a worker node. To avoid this issue, disable Windows Firewall on the worker computer before adding the worker to the Tableau Server cluster.
**Note:** If you configured SAML on the Tableau Server primary node, you need to copy the SAML certificate, SAML key, and SAML IdP metadata files to each node that's running a Tableau application server process (vizportal.exe). For more information, see Configure a Server Cluster for SAML.

To configure Tableau Server for worker nodes:

1. Once the Worker software is installed on worker computers, and with the primary Tableau Server still stopped, return to the primary server and open the configuration utility by selecting **Tableau Server 10.2 > Configure Tableau Server** on the Start menu.

2. In the Configuration Utility, enter your password on the **General** tab then select the **Servers** tab and click **Add**.

3. In the next dialog box, type the IPv4 address or computer name for one of the worker computers and specify the number of **VizQL**, **Application Server**, **Backgrounder**, **Cache Server**, **Data Server**, **Data Engine**, **File Store**, **Repository**, **Gateway**, and **Search & Browse** processes to allocate to the computer.
With the 64-bit version of Tableau Worker Server, you can run up to two instances of each process. In rare cases and if the server’s hardware allows, that limit can be changed. See Server Process Limits and Tableau Server Performance Overview for more information.

**Note:** You can only add a second repository if you have three or more nodes. If you attempt to add a repository to a two-node cluster, a message displays to let you know that you are limited to one instance of the repository, and that high availability and failover are not available in a two-node configuration.

By default, the data engine and file store, repository, and gateway are hosted on the primary server. Running these processes on an additional server, or moving them off
of the primary server, is part of configuring for high availability. See High Availability for more information.

4. Click **OK**. It may take several minutes for the updates to complete.

5. Repeat these steps for each computer you want to add to the distributed environment. When you’re finished adding workers, click **OK** to save the changes and close the Configuration utility, then start Tableau Server on the primary node.

**Database Drivers**

The installers for Tableau Server and Tableau Server Workers automatically install drivers for Oracle and Oracle Essbase databases. If you plan to publish workbooks and data sources that connect to other databases, you will need to make sure that both your primary and worker servers have the corresponding drivers.

Workers running VizQL, application server, data server, or backgrounder processes need these database drivers. For example, if you have a worker dedicated as a VizQL server and another computer dedicated to extract storage, you only need to install drivers on the computer running the VizQL server process.

<table>
<thead>
<tr>
<th>Server process</th>
<th>Requires database driver?</th>
</tr>
</thead>
<tbody>
<tr>
<td>VizQL server</td>
<td>yes</td>
</tr>
<tr>
<td>Application server</td>
<td>yes</td>
</tr>
<tr>
<td>Data server</td>
<td>yes</td>
</tr>
<tr>
<td>Backgrounder</td>
<td>yes</td>
</tr>
<tr>
<td>API server</td>
<td>yes</td>
</tr>
<tr>
<td>Data engine (extract storage)</td>
<td>no</td>
</tr>
<tr>
<td>Repository</td>
<td>no</td>
</tr>
<tr>
<td>Gateway</td>
<td>no</td>
</tr>
<tr>
<td>Server process</td>
<td>Requires database driver?</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Cluster controller</td>
<td>no</td>
</tr>
<tr>
<td>Cache server</td>
<td>no</td>
</tr>
<tr>
<td>Search &amp; Browse</td>
<td>no</td>
</tr>
<tr>
<td>File store</td>
<td>no</td>
</tr>
</tbody>
</table>

**Reinstall and Configure Worker Node**

You might need to reinstall one of your Tableau worker nodes. To do so, follow one of these procedures. The specific steps you take depend on whether or not the worker you are reinstalling has data engine or repository components on it and whether or not these are duplicated on any other node in the installation.

**Note:** Reinstalling multiple workers at the same time could lead to data loss.

Use the following procedure to help you reinstall and configure a worker node that is hosting the *only* data engine or repository in the distributed installation. Every Tableau Server installation requires at least one data engine and one repository. If you are reinstalling the worker node that hosts either of these processes, you must first add the process to a second node.

To reinstall the worker node hosting the data engine or repository instance

1. Create a full backup of Tableau Server. For more information, see Back Up Tableau Server Data.

2. Stop Tableau Server on the primary by selecting **Tableau Server 10.2 > Stop Tableau Server** on the Windows Start menu, or by running the `tabadmin stop` command from the command line.

3. On the Start menu, select **Tableau Server 10.2 > Configure Tableau Server**.
4. In the Configuration Utility:

- On the **General** tab, enter your password.
- On the **Servers** tab, add the data engine and/or repository components that the worker is hosting to another worker or to the primary, and then save your changes.
  
  For example, if the worker you are reinstalling currently hosts the data engine, add the data engine to another node.

5. **Start the primary Tableau Server node** so that synchronization completes between the existing data engine or repository on the worker you will be reinstalling and the newly added instances of those processes.

6. Open the Status page in Tableau Server and check on the components you added:

   - If you added a data engine/file store, wait until the new file store status no longer says "Syncing".

   - If you added a repository, wait until the new repository status says "Passive".

7. Stop Tableau Server.

8. If you are removing a node that hosts data engine, **decommission** the file store you are removing:

   From the Windows command line, in the **C:\Program Files\Tableau\Tableau Server\10.2\bin** directory, run:

   ```
   tabadmin decommission <worker_node>
   ```

   where `<worker_node>` is the name or ip address of the worker you are going to remove, as it appears in the list of servers on the **Servers** tab of the Configuration utility.

9. In the Configuration Utility:
- On the **General** tab, enter your password.
  - On the **Servers** tab, select the worker you want to reinstall and then click **Delete**.
  - Save your changes.

10. Start Tableau Server and verify that everything is working as expected.

11. On the worker:
   - Uninstall the Tableau Server worker software from Windows Control Panel.
   - Delete (or rename) the following folders: `C:\Program Files\Tableau` and `C:\ProgramData\Tableau`. **ProgramData** is a hidden folder so may not be visible.
   - Install the updated worker software.

12. On the Tableau Server primary, stop Tableau Server, add the worker back into the configuration, and then save the changes.

   **Note:** The data engine and repository need to remain on at least one node while you are re-adding the worker.


Use the following procedure to help you reinstall and configure a Tableau worker that is either not hosting a data engine or repository, or is hosting a component but there is an additional node that is hosting the same component.

To reinstall and configure the worker node that is either not hosting data engine or file store or hosting one that is also on another node

1. Create a full backup of Tableau Server.

2. Stop Tableau Server on the primary by selecting **Tableau Server 10.2 > Stop Tableau Server** on the Start menu or by running the `tabadmin stop` command at
a command prompt.

3. If you are removing a node that includes a data engine/file store pair, **decommission** the file store on that node:

   From the Windows command line, in the `C:\Program Files\Tableau\Tableau Server\10.2\bin` directory, run:

   ```
tabadmin decommission <worker_node>
   ```

   *where* `<worker_node>` *is the name or ip address of the worker you are going to remove, as it appears in the list of servers on the Servers tab of the Configuration utility.*

4. Open the configuration utility by selecting **Tableau Server 10.2 > Configure** Tableau Server on the Start menu.

5. In the Configuration Utility:
   - On the **General** tab, enter your password.
   - On the **Servers** tab, select the worker you want to reinstall and then click **Delete**.
   - Save your changes.

6. Start Tableau Server and verify that everything is working as expected.

7. On the worker:
   - Uninstall the Tableau Server Worker software from Control Panel.
   - Delete (or rename) the following folders: `C:\Program Files\Tableau` and `C:\ProgramData\Tableau`. `ProgramData` is a hidden folder so may not be visible.
   - Install the updated worker software.

8. On the primary node, stop Tableau Server, use the configuration utility to add the worker back into the configuration, and then save the configuration.

**Maintain a Distributed Environment**

After you set up a primary and one or more worker servers for a distributed installation, you can perform all subsequent configuration and updates from the primary server, using the command line tools and configuration utility on the primary server. Updates will be pushed to the workers automatically.

When you installed worker servers, you specified the primary’s IPv4 address or computer name. If that IP address or computer name changes, you will need to re-install the worker servers.

You can monitor the status of the Tableau Server cluster on the server Maintenance page. See Server Maintenance to learn more about maintaining the server.

![Server Status Table](image-url)
Move the Repository Process

If you need to delete a worker node from your Tableau Server configuration and that worker is hosting the only instance of the repository, you must move the process to another computer before deleting the node. There must always be at least one active instance of the repository, so you cannot remove an instance if it is the only instance.

Beginning with version 10.0, you cannot have more than one instance of the repository unless you have at least three nodes. The steps below assume you have at least three nodes in your Tableau Server installation. If you need to move a repository in a two-node environment, you need to follow a set of manual steps using tabadmin. For more information, see Move the Repository Process in a Two-Node Installation.

**Note:** If you are also moving a data engine/file store group, you can move the repository at the same time. See Move the Data Engine and File Store Processes.

1. Create a full backup of Tableau Server. For more information, see Back Up Tableau Server Data.

2. If you haven’t done so already, stop Tableau Server and run the Tableau Server Configuration utility (**Start > Tableau Server 10.2 > Configure Tableau Server**) on the primary Tableau Server node.

3. On the **Servers** tab, select the computer (IP address or computer name) onto which you want to move the repository and click **Edit**. It can be another worker or the primary (**This Computer (Primary)**).

4. In the **Edit Tableau Server** dialog box, select the **Repository** check box and click **OK** to close the dialog box.

5. Click **OK** in the Tableau Server Configuration utility to save your changes and close the utility.

6. Start the primary Tableau Server node so that synchronization completes between
the existing repository and the newly added repository.

7. Open the Status page in Tableau Server and wait until the new repository status no longer says "Setting up". When the repository status is "Passive" the synchronization is complete.

8. Stop the server and open the Tableau Server Configuration utility.

9. On the Servers tab, highlight the computer from which you are removing the process and click Edit.

10. Remove the processes you are moving: clear the Repository check box and click OK.

11. Click OK again to save your changes and close the utility.

12. Start the primary server so that the changes can take effect.

If you are performing this procedure as part of deleting a worker node from the Tableau Server configuration (as described in Remove a Worker Node) stop Tableau Server again before proceeding.

**Move the Data Engine and File Store Processes**

If you need to delete a worker node from your Tableau Server configuration and that worker is hosting the only instance of the data engine and file store (which handle extracts), you must first move the processes to another computer. There must always be at least one instance of the data engine/file store processes, so you cannot remove an instance if it is the only instance.

1. Create a full backup of Tableau Server. For more information, see Back Up Tableau Server Data.

2. If you haven’t done so already, stop the primary Tableau Server node and run the Tableau Server Configuration utility (Start > Tableau Server 10.2 > Configure Tableau Server) on the primary Tableau Server node.
3. On the **Servers** tab, highlight the computer (IP address or computer name) onto which you want to move the processes and click **Edit**. It can be another worker or the **primary** (This Computer (Primary)).

4. In the **Edit Tableau Server** dialog box, enter the number of **Data Engine** processes, and click **OK** to close the dialog box.

   **Note:** When you install a data engine process on a node, the file store process is also installed. Changing the value of **Data Engine** from 0 automatically selects the **File Store** check box.

5. Click **OK** in the Tableau Server Configuration utility to save your changes and close the utility.

6. **Start the primary Tableau Server node** so that the changes can take effect.

7. Open the Status page in Tableau Server and wait until the new file store status no longer says "Synchronizing".

8. **Stop the server**.

9. **Decommission** the file store on the worker:

   From the Windows command line, in the `C:\Program Files\Tableau\Tableau Server\10.2\bin` directory, run:

   ```
tabadmin decommission <worker_node>
   
   where `<worker_node>` is the name or ip address of the worker you are going to remove, as it appears in the list of servers on the **Servers** tab of the Configuration utility.
   
   10. Open the Tableau Server Configuration utility and on the **Servers** tab, highlight the computer from which you are removing the process and click **Edit**.
11. Remove the processes you are moving: enter 0 for Data Engine and click **OK**. The File Store check box will be cleared automatically.

12. Click **OK** again to save your changes and close the utility.

13. **Start the primary server** so that the changes can take effect.

If you are performing this procedure as part of deleting a worker node from the Tableau Server configuration (as described in Remove a Worker Node) stop Tableau Server again before proceeding.

Remove a Worker Node

**To delete a worker from your Tableau Server configuration:**

1. **Stop the server** on the primary Tableau Server.

2. On the primary server, open the configuration utility by selecting Tableau Server `<version>` > Configure Tableau Server on the Start menu.

3. In the configuration utility, select the **Servers** tab.

4. If the worker is hosting the data engine or the repository, move those processes onto another machine before continuing. See Move the Data Engine and File Store Processes for steps.

5. Next, highlight the worker and click **Delete**.

6. Click **OK**.

7. Start the server.

Update Configuration for a New IP Address

You can and should use hostnames (computer names) of your server computers when configuring Tableau Server. Doing this makes it relatively easy to update the server configuration if an IP address changes, and using hostnames is the only way Tableau Server supports IPv6 networks.
Tableau Server uses IP addresses for communications between processes and nodes. As a result, if an IP address changes, Tableau Server will not function properly until you update the server configuration. This might happen if a VM is down for a significant amount of time (longer than the DNS record time to live) and the network environment uses DHCP.

To update the configuration for a new primary node IP address:

- On each worker node, restart Tableau Server.

To update the configuration for a new worker node IP address:

1. On the primary Tableau Server computer, open a command prompt as an administrator.

2. Navigate to the server \bin directory. For example, in a default installation, type the following:

   cd "C:\Program Files\Tableau\Tableau Server\<version>\bin"

3. Stop the server:

   tabadmin stop

   **Note:** If the IP address on the primary node has changed, the `tabadmin stop` command will not work because the worker nodes will not accept connections from the new IP address. If you cannot stop Tableau Server, restart the worker nodes and then try again to stop the server.

4. Update the configuration:

   tabadmin config

5. Start the server:

   tabadmin start
Move the Repository Process in a Two-Node Installation

The Tableau Server repository is installed on the primary node by default. If your distributed installation has at least three nodes total (one primary and two workers), you can move the repository to another node (see Move the Repository Process), or add a second repository instance to another node (see Install and Configure Worker Nodes).

If you have a two-node Tableau Server cluster, moving the repository from the primary node to the worker node requires you to use the tabadmin utility to issue a series of commands. This move process between the primary node and a single worker is only supported from the command line. You cannot move a repository using the Tableau Server configuration utility.

Before you start: For this procedure to work, you must specify each node using the identifier that Tableau Server uses for the node. You can find these on the Status page, or in the output of the `tabadmin status -v` command. The names or IP addresses you use in the commands below must match what is shown on the Status page or the command output. Names are case-sensitive.

**Important:** To successfully complete this procedure, you must follow the steps in order and as described. If you do not, you could lose your Tableau Server data. You should only attempt this if you are knowledgeable about the tabadmin utility and comfortable using it to configure Tableau Server.

1. Create a full backup of Tableau Server. Keep this backup in a safe location that is not on one of your server computers. For more information, see Back Up Tableau Server Data.

2. Open a command prompt as administrator and navigate to the Tableau Server `\bin` directory. By default this is located here:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

3. Set the primary as one host of the repository:
tabadmin set pgsqlo.host [primary_ip or primary_name]

**Important:** Be sure you specify the primary node. If you mistakenly provide an IP address or name that does not belong to the primary, Tableau Server will no longer recognize your existing repository data and you cannot fix this without restoring your backup, created in step 1 above.

4. Set the worker as another host of the repository:

   tabadmin set pgsq11.host [worker_ip or worker_name]

5. Restart Tableau Server:

   tabadmin restart

   The restart command runs three separate commands: stop, configure, and start. During the start step, a warning message will display about an invalid value in tabsvc.yml and a requirement of a minimum of three nodes for multiple repositories:
   
   *** WARNING: Invalid value(s) found in: 'C:/ProgramData/Tableau/Tableau Server/config/tabsvc.yml'
   
   A value of 'server_name' instances for 'pgsq11.host' is not recommended. Tableau Server requires a minimum of three nodes to support multiple repositories and repository failover. Either add a third node or remove one instance of the repository.

   You can ignore this message while following this procedure.

6. When Tableau Server starts, the repository on the primary will begin synchronizing with the new repository, copying all data to that second repository. Wait for the repository sync to complete, so all data in the repository on the primary node is also in the repository on the worker.
You can check the server status page to see if the repositories are syncing. To verify that the sync process is complete, at a command prompt, run `tabadmin status -v`. The worker will be listed by IP address and should include a line for the repository:

'Stableau Server Repository' (process ID) is running (Passive Repository)

If the repository is listed as "running (Passive Repository)" then the sync process is complete.

7. Reset the default for the `pgsql<n>` values. These are only used when there are two repository instances:

   `tabadmin set pgsql0.host -d`
   `tabadmin set pgsql1.host -d`

8. Set the worker as the only host of the repository:

   `tabadmin set pgsql.host [worker_ip or worker_name]`

   **Important:** Be sure you specify the worker node the primary repository synchronized to. If you do not, Tableau Server will not recognize the repository and you cannot fix this without restoring your backup, created in step 1 above.

9. Restart Tableau Server:

   `tabadmin restart`

High Availability

A high availability installation of Tableau Server is a special type of distributed installation designed to maximize the availability of Tableau Server.
If you’re configuring a Tableau Server system for high availability, the steps you perform are all designed to build in redundancy, thus reducing your potential downtime. The four areas that require redundancy are the data engine, repository, and gateway processes, and the primary Tableau Server, which runs the server’s licensing component. Because there must always be one active of the repository process, configuring the cluster is a multi-phased procedure that requires the primary Tableau Server to be stopped and restarted at certain points so that settings can take effect. For exact steps, see Configure for Failover and Multiple Gateways and Use a Backup Primary. See Distributed Requirements as well.

The minimum supported configuration for high availability is a three-node system. This includes a primary server to run licensing and two workers to host the main processes. You can increase reliability of the system by adding a fourth computer to serve as a backup primary. If you run a gateway process on all nodes, it also makes sense to use a load balancer for the gateways.

A Single Server System

After you install the primary Tableau Server, it is running at least one instance of all server processes. This is the most basic configuration of Tableau Server. It has no redundancy.
Here's what the Process Status table on the Server Status page typically looks like for a single-server system (not all processes shown above appear on the Status page):
To build in redundancy, you need to add additional servers to host copies of the repository and data engine/file store processes. In addition, to reduce the system's vulnerability, you can run multiple gateways, and the primary should be isolated on its own node, ideally running as few of the server processes as possible. The fewest number of computers required to achieve this is three (see A Three-Node System).

**A Three-Node System**

A three-node system helps you reduce the primary's vulnerability:
This configuration would look like the following Process Status table on the Server Status page.
In a three-node cluster, the Data Engine and Repository processes have been moved from the primary to a worker, and the primary is only running the Gateway and Search & Browse processes. In this configuration, if your active worker fails, the passive worker automatically becomes active. Exactly how to create this three-node cluster, including how to add the workers and remove the processes from the primary, is described in Configure for Failover and Multiple Gateways. (Licensing functionality is integral to the primary and cannot be removed, so it is not displayed on the Status page. Cluster Controller and Coordination Service are installed on all nodes as part of the "base install" and are not configurable. Coordination Service does not show on the Status page and Cluster Controller only displays if there are two or more nodes in the cluster.)
There are still two things you can do to improve this three-node cluster: 1) add a load balancer to interface with the three active gateways, and 2) create a backup to address the single point of failure: the primary. See the topics below for details.

**Add a Load Balancer**

At this point, all three nodes have gateways, which are used to route requests to available server processes. Unlike the repository process, there aren't active and standby gateways. All gateways are active. To further reduce your cluster's potential for downtime, you should configure a load balancer.

**Add a Backup Primary**

Adding a backup primary provides a safeguard for your system. The backup primary is an additional server added to the system to be ready if your primary fails. While it is not an active server, after you complete the first set of steps in Use a Backup Primary, it is ready to be activated. While the backup primary needs to be licensed during installation, it does not count as one of the three environments allowable under the Tableau EULA.

Here’s what the system looks like with a backup primary:
The Process Status table for the configuration shown above looks the same as for a three-node system. If the primary fails and you perform the steps for the backup primary to take over, your system is back online using the new primary:
Tableau Server service license check

A number of processes are installed when you install Tableau Server. Some of these processes are dependent on the existence of a valid Tableau Server license while other installed processes do not. The subset of Tableau Server that require a valid Tableau Server license are considered "licensed processes."

When a licensed process starts or restarts, the process checks with the Tableau Server License Manager service on the primary node to verify there is a valid license. When the License Manager validates the license, the process is fully functional and able to respond to requests from other Tableau Server processes. Once a licensed process has received confirmation from the License Manager, the process does not need to reconfirm the license for 72 hours, or until the process restarts. If the process is not able to verify that it is licensed (if
the primary node is unavailable, for example) it cannot run, but it continues to check for a valid license until it confirms the license. To see when the last licensing check occurred, look at the log files in the ProgramData\Tableau\Tableau Server\data\tabsvc\logs\licensing folder. For more information about licensed processes, see Licensed processes.

Quick Start: Configuring Failover & Highly Available Gateways

Extracts and repository data can change rapidly and even regular backups may not help you fully recover from a system failure. Another vulnerability is having a single entry point, or gateway, for your Tableau Server cluster. To help with this, distributed Tableau Server deployments provide real-time content replication and failover support, as well as the ability to run multiple gateways.

1 Install the Servers

Install Tableau Server on the primary computer. After Setup, stop the server and run Tableau Worker Setup on the two additional computers that will provide failover support. During Worker Setup, provide the primary’s IPv4 address or name.

To stop or start the server, at a command prompt, go to the Tableau Server bin folder and type `tabadmin stop` or `tabadmin start`.

Stop the primary server and open its Configuration utility.
2 Set Up Email Alerts

After you add the second worker and with the Configuration utility still open, click the Alerts and Subscriptions tab in the Configuration utility and select Send email alerts for server health issues:

![Tableau Server Configuration](image)

When you test, your email account will receive messages about the services.

Enter the name of your SMTP server—and a username and password if it’s required by your SMTP server.

Next, enter the email account that will send an alert if there’s a system failure, and the account(s) that will receive it. Click OK and start Tableau Server.
3 Configure the Distributed System

1. On the **Servers** tab, click **Add** to add a worker server. Enter its computer name or IPv4 address. Enter 1 for each process. Select **Repository**, **Gateway**, and **Search & Browse**. Click OK:

![Add Tableau Server dialog box](image)

2. Click **Add** to add a second worker server. Enter its IPv4 address or computer name. Enter 1 for every process except the **Data Engine** (set that to 0). Leave **Repository** cleared but select **Gateway**. Click OK.

3. Click **OK** to close the Configuration utility, then start Tableau Server on the primary server so your changes can take effect.

4. Stop the primary server and open the Configuration utility.

5. On the **Servers** tab, select the second worker and click **Edit**. Set **Data Engine** to 1 and select the **Repository** check box. Click **OK**, then **OK** again to close the Configuration utility. Start Tableau Server.
6. Still on the **Servers** tab, select **This Computer (Primary)** and click **Edit**. Set every process to 0, clear the **Repository** check box but keep **Gateway** selected. Click **OK**.

4 Load Balance the Gateways

You can optionally use a load balancer to ensure the cluster’s availability in the event of gateway failure, and to distribute the cluster’s workload.

In your load balancer, enter the IP address for each computer that’s running a gateway process (the primary and the two workers), and configure the load balancing method, such as Fastest or Round Robin

**Quick Start: Creating a Backup Primary**

This Quick Start describes how to create a backup of your primary Tableau Server computer so that if your primary fails, it will take just a few steps to bring your backup primary online.

Before beginning, make sure you have configured your environment for failover and highly available gateways, using the Quick Start: Configuring Failover & Highly Available Gateways as your guide. You should have two worker nodes and a primary Tableau Server. To help ensure a smooth transition for your Tableau Server users, assign the same common name to both your current and backup primary servers.
Configuring Primary Failover

1 Configure the Primary

Stop the server on your primary Tableau Server computer, then run the following command from the Tableau Server bin directory:

```
tabadmin failoverprimary --primary "<computer1>,<computer2>"
```
computer1 is the current primary node computer name or IPv4 address. computer2 is the backup primary node computer name or IPv4 address.

2 Copy the Primary Config and Keystore

Copy configuration and keystore information from the primary node to the backup primary. The configuration file is located in a hidden folder: C:\ProgramData\Tableau\Tableau Server\config\tabsvc.yml. The keystore is the tabsvc folder and everything it contains, located in ProgramData\Tableau\Tableau Server\config\tabsvc. Copy both the tabsvc.yml file and the tabsvc folder to a temporary location on the backup primary node. Edit the copy of tabsvc.yml and replace all occurrences of the IPv4 address or computer name for the primary node with the IPv4 address or computer name for the backup primary node.

3 Install & Disable the Backup Primary

Install Tableau Server on your backup primary. After Setup completes, open a command prompt on the backup primary and stop the server. Next, run the following commands:

```
tabadmin autostart off
tabadmin config
```

Before you begin the next section, power down your primary to simulate a system failure.

After the Primary Fails

4 Configure the Backup Primary

On your backup primary, use the tabsvc.yml file you edited in step 2 to overwrite the locally installed tabsvc.yml and the tabsvc folder you copied to overwrite the locally installed ProgramData\Tableau\Tableau Server\config\tabsvc folder on the backup primary node. (If web data connectors were imported to the primary server, copy them to the primary backup.) Next, open a command prompt on your backup primary and run the following command from the backup primary's Tableau Server bin directory:

```
tabadmin failoverprimary --primary "<computer2>,<computer1>"
```
computer2 is the computer name or IPv4 address of your backup primary (soon to be your active primary) and computer1 is the computer name or IPv4 address for your former primary (soon to be your backup).

5 Start the Backup Primary

Run the following command:

```
tabadmin autostart on
```

```
tabadmin config
```

Then start the computer. Your backup primary is now your primary.

6 View Status

Sign in to Tableau Server on your new primary and view the status of your distributed system on the Status page. In the first row of the Status table you’ll see the computer name or IP address of your new primary server.

Configure for Failover and Multiple Gateways

Do the following to configure a three-computer cluster that provides multiple gateways and failover support. In most cases, running multiple gateways makes sense only if you plan to also use a load balancer.

1. **Install Tableau Server** on your primary computer.

2. After Setup completes, check the Status page. All the processes should have a green “active” status:
3. **Stop the server** on the primary computer.

4. Run **Tableau Worker Setup** on the two additional computers or VMs that will provide failover and extra gateway support. During Worker Setup, you will need to provide the computer name (recommended) or IPv4 addresses of the primary Tableau Server. If you enter multiple IPv4 addresses, separate each with a comma.
Note: The primary computer must have a static IP address assigned to it, even if you are using the primary's computer name to identify it. For more information, see Update Configuration for a New IP Address.

5. With the primary server still stopped, start the Tableau Server Configuration utility: Start > All Programs > Tableau Server > Configure Tableau Server. On the General tab enter the Run As account password.

6. On the Servers tab, click Add to add a worker.

The Add button is not available if you are configuring a server that is licensed with a Tableau Server—Single-Machine Core license.

7. Enter the IPv4 address or computer name of the worker, enter 1 for Data Engine (File Store will be automatically selected) and select the Repository check box.
If you want the worker to run other server processes, enter the number of instances you want to run, such as 1 or 2. Click OK to close the Add Tableau Server dialog box.

**Note:** If you install Tableau Server on a two-node cluster, a message displays to let you know that you are limited to one instance of the repository, and that high availability and failover are not available in a two-node configuration. You can add a third node but are not required to do so. In a two-node cluster, if one of the two nodes goes down, Tableau Server may not function correctly.

8. Click **Add** on the **Servers** tab to add another worker.

9. Enter the IPv4 address or computer name of the second worker, enter at least 1 for every process but the **Data Engine** (set that to 0). Select **Gateway**.
Click **OK** to close the Add Tableau Server dialog box and click **OK** to save the configuration and close the Configuration utility.

10. **Start the server** on the primary computer.

11. **Important:** Allow several minutes for the server’s synchronization processes to copy data. This can take anywhere from 5 minutes to 15 minutes (or even much longer) depending on the size of your installation and the number of extracts.

12. Open the Status page in Tableau Server and check on the components you added:
   - If you added a data engine/file store, wait until the new file store status no longer says "Syncing".
   - If you added a repository, wait until the new repository status says "Passive".

13. After you’ve confirmed that the synchronization is complete, **stop the server** on the primary.

14. Open the Configuration utility. On the **General** tab enter the Run As account password, then click the **Servers** tab, select **This Computer (Primary)**, and click **Edit**.

15. In the Edit Tableau Server dialog box, set **Data Engine** to 0 and clear the **Repository** check box. Keep **Gateway** selected. If you want the primary Tableau Server to run nothing but the gateway process (Apache), you can remove the remaining server
processes from the primary by entering 0 in each text box.

With a core-based license, the gateway and search & browse processes consume no cores. Configuring the primary Tableau Server to run nothing but the gateway and search & browse is a useful strategy if, for example, you have a 16-core server license and two 8-core workers. You can run three nodes (the primary plus two workers) and only the worker nodes are consuming cores.

Click OK.

16. On the Servers tab, select the first worker, click Edit, and select the Gateway check box. Leave the other settings unchanged. Click OK.

17. Still on the Servers tab, select the second worker and click Edit.

18. Set Data Engine to 1 (File Store will be automatically selected) and select the
Repository check box.

The **Servers** tab should now look similar to this:
20. You can also set up email alerts so that you’re notified of server failures or changes in status for your data engine and repository processes. To do this, click the **Alerts and Subscriptions** tab in the Configuration utility and follow the steps in To configure email alerts for system failures.

21. Click **OK** to close the Configuration utility.

22. If you are removing a data engine/file store (step 14 above), a message appears to let you know that the file store was not decommissioned, and asking if you want to decommission it. Click **Yes** to decommission the file store.

23. **Start the server** on the primary computer (it may take a few minutes for your changes to take effect). Your system is now configured to provide failover support for the repository process. It is also configured for multiple gateways. You can now use a load balancer to ensure the cluster's availability in the event of a gateway failure—and to distribute the cluster’s workload.

The Status page should look similar to this:
Configure Tableau Server for High Availability with Coordination Service-Only Nodes

As a part of the Tableau Server installation, a Coordination Service process is installed on each server node. Coordination Service is a service built on Apache ZooKeeper, that coordinates activities on the server. If you are running Tableau Server on computers that meet or just exceed the minimum hardware requirements, you may want to install Tableau Server in a configuration that uses Coordination Service-only nodes. This means installing Coordination Service on nodes that run no other server processes, and removing Coordination Service from the nodes that are running other server processes. This procedure explains how to do this.
To run Tableau Server with Coordination Service-only nodes

1. Install Tableau Server on the primary computer (primary node).

2. Install Tableau Server worker software on additional computers.

   You need at least three nodes to run Coordination Service, plus the nodes on which you want to run Tableau Server as part of your distributed installation. In the example below, a total of six nodes are used.

3. On the primary node, run the Configuration utility, and add the nodes on which you installed the worker software.

4. In the Configuration utility, edit each server that will run Tableau Server, and specify the processes that should be installed. For more information on how to configure a distributed installation, see Install and Configure Worker Nodes.

5. In the Configuration utility, edit each server that will run only the Coordination Service process, and configure the node so it is not running any other Tableau Server processes. These nodes are considered "external" to the Tableau Server configuration and will only run the only Coordination Service.

   **Note:** The Base Install process is required and installs Coordination Service. You cannot remove it.

6. Close the Configuration utility.

7. On the primary node, at the command line:

   a. Configure 0 Coordination Service processes on the nodes that are running Tableau Server processes.

   b. Update the configuration on all nodes.

   c. Start Tableau Server.
Example

The following example shows how you would configure a three-node distributed installation of Tableau Server along with three nodes running just Coordination Service. If you want fail-over support in Tableau Server, you must run Coordination Service on a minimum of three nodes so there is a quorum.

1. **Install Tableau Server** on your primary computer.

   After Setup completes, check the Server Status page. All the processes should have a green “active” status.

![Server Status](image.png)

2. **Stop the server** on the primary computer.

3. Run **Tableau Worker Setup** on five additional computers or VMs. Two of these will be worker nodes in the installation, run Tableau Server processes, and provide failover support. The other three will run Coordination Service.
During worker setup, you will need to provide the computer name (recommended) or IPv4 addresses of the primary Tableau Server.

![Setup - Tableau Server Worker](image)

**Worker Configuration**

**Primary Server**

Enter the computer name or IPv4 address of the primary Tableau Server. If the server has multiple IPv4 addresses, enter all of them, separating each with a comma.

**IP Address or Name:**

TABLEAU_SERVER

---

**Note:** The primary computer must have a static IP address assigned to it, even if you are using the primary's computer name to identify it. For more information, see Update Configuration for a New IP Address.

---

4. Start the Tableau Server Configuration utility: **Start > All Programs > Tableau Server > Configure Tableau Server.** On the **General** tab, enter the Run As account password.

5. On the **Servers** tab, click **Discover** to add the five worker nodes.

6. Select the first worker node, and then click **Edit.** Enter **1** for **Data Engine** (**File Store will be automatically selected**), and then select the **Repository** check box.

   Click **OK** to close the Edit Tableau Server dialog box.

7. Select the second worker node, and repeat step 6.

8. For each of the next three computers:
a. Select the computer from the **Servers** list, click **Edit**, and then enter 0 for every process. Clear the options for **Repository**, **Gateway**, and **Search & Browse**. **Base Install** will be selected and you cannot change this. These nodes will run only Coordination Service.

The configuration for each of these nodes should look like this:

![Edit Tableau Server dialog box]

b. Click **OK** to close the Edit Tableau Server dialog box.

9. Click **OK** to close the Edit Tableau Server dialog box, and then click **OK** to save the configuration and close the Configuration utility.

10. At a command prompt on the primary computer, remove Coordination Service from the primary node and the two worker nodes that are running Tableau Server:

    `tabadmin set worker0.zookeeper.procs 0`
tabadmin set worker1.zookeeper.procs 0

tabadmin set worker2.zookeeper.procs 0

tabadmin config

**Note:** You can find the number of each node from the status page. The primary node is always **worker0**.

11. **Start the server** on the primary computer.

**Add a Load Balancer**

You can enhance the reliability of a Tableau Server cluster by running multiple gateways and configuring a load balancer to distribute requests across the gateways. Unlike the repository process, which can be active or passive, all gateway processes are active. If one gateway in a cluster becomes unavailable, the load balancer stops sending requests to it. The load balancer algorithm you choose determines how the gateways will route client requests.

If you plan to also create a backup primary and that computer will be running a gateway process, be sure to identify that gateway to your load balancer, along with all the other gateways.

**Note:** If you will be using Kerberos authentication, you need to configure Tableau Server for your load balancer before you configure Tableau Server for Kerberos. For more information, see [Configure Kerberos](#).

**Guidelines**

Note the following as you configure your load balancer to work with Tableau Server:

- **Tested load balancers**: Tableau Server clusters with multiple gateways have been tested with Apache and F5 load balancers.
If you are using an Apache load balancer and creating custom administrative views, you need to connect directly to the Tableau Server repository. You cannot connect through the load balancer.

- **Tableau Server URL**: When a load balancer is in front of a Tableau Server cluster, the URL that's accessed by Tableau Server users belongs to the load balancer, not the primary Tableau Server.

- **Trusted host settings**: The computer running the load balancer must be identified to Tableau Server as a trusted host. See the procedure below for how to configure Tableau Server.

- **Proxy server configurations**: The settings used to identify a load balancer to Tableau Server are the same ones that are used to identify a proxy server. If your Tableau Server cluster requires both a proxy server and a load balancer, both must use a single external URL defined in `gateway.public.host` and all proxy servers and load balancers must be specified in `gateway.trusted` and `gateway.trusted_hosts`. For more information, see Configure a reverse proxy server.

- **Persistence**: External load balancer configuration should not include any persistence or affinity unless Active Directory (NTLM) authentication is used. If you are using Active Directory authentication, then use cookie-based persistence for NTLM negotiation requests only.

  **Note**: You can use persistence with Kerberos enabled.

Configure Tableau Server to Work with a Load Balancer

You can configure Tableau Server to work with a load balancer by performing the following steps.
1. **Stop the server.**

2. In the Tableau Server bin directory, enter the following command, where `name` is the URL that will be used to reach Tableau Server through the load balancer:

   ```bash
   tabadmin set gateway.public.host "name"
   ```

   For example, if Tableau Server is reached by entering `tableau.example.com` in a browser address bar, enter this command:

   ```bash
   tabadmin set gateway.public.host "tableau.example.com"
   ```

3. By default, Tableau assumes that the load balancer is listening on port 80 for external communications. To use a different port, enter the following command, where `port_number` is the port:

   ```bash
   tabadmin set gateway.public.port "port_number"
   ```

   For example, if your load balancer is configured for SSL and listening on port 443, enter the following command:

   ```bash
   tabadmin set gateway.public.port "443"
   ```

4. Now, enter the following command, where `server` is the IPv4 address or computer name of the load balancer:

   ```bash
   tabadmin set gateway.trusted "server"
   ```

   The value for `server` can be a comma-separated list, for example:

   ```bash
   tabadmin set gateway.trusted "10.32.139.45, 10.32.139.46, 10.32.139.47"
   ```

   or

   ```bash
   tabadmin set gateway.trusted "proxy1, proxy2, proxy3"
   ```

5. In the next command, you will provide any alternate names for the load balancer, such
as its fully-qualified domain name, any non-fully-qualified domain names, and any aliases. These are the names a user might type in a browser. Separate each name with a comma:

```
tabadmin set gateway.trusted_hosts "name1, name2, name3"
```

For example:

```
tabadmin set gateway.trusted_hosts "lb.example.com, lb, ftp.example.com, www.example.com"
```

6. **Run the `config` command:**

```
tabadmin config
```

7. **Start the server** so the changes can take effect.

**Use a Backup Primary**

Before you follow the procedures in the topics below, follow the steps in Configure for Failover and Multiple Gateways. After going through those steps, you have two worker servers that are providing failover support. Each server is also running a gateway, for which a load balancer can be configured. The primary Tableau Server is running a gateway process and licensing, which is not exposed or assignable as a process. Now that you have redundancy for the data engine, repository, and gateway, you need to build in redundancy for your primary Tableau Server. You do this by creating a backup of it. While the backup primary needs to be licensed during installation, it does not count as one of the three environments allowable under the Tableau EULA.

Tableau Server service license check

A number of processes are installed when you install Tableau Server. Some of these processes are dependent on the existence of a valid Tableau Server license while other installed processes do not. The subset of Tableau Server that require a valid Tableau Server license are considered "licensed processes."
When a licensed process starts or restarts, the process checks with the Tableau Server License Manager service on the primary node to verify there is a valid license. When the License Manager validates the license, the process is fully functional and able to respond to requests from other Tableau Server processes. Once a licensed process has received confirmation from the License Manager, the process does not need to reconfirm the license for 72 hours, or until the process restarts. If the process is not able to verify that it is licensed (if the primary node is unavailable, for example) it cannot run, but it continues to check for a valid license until it confirms the license. To see when the last licensing check occurred, look at the log files in the ProgramData\Tableau\Tableau Server-data\tabsvc\logs\licensing folder. For more information about licensed processes, see Licensed processes.

Removing a Backup Primary

If you have a backup primary node that you no longer need, you can easily remove it from your Tableau Server installation. To remove a backup primary, all you need to do is use Windows Control Panel to uninstall Tableau Server.

Create a Backup Primary

This procedure describes how to create a backup primary. To do this you need to configure your primary node using a failoverprimary command that uses either computer names or IP addresses. We strongly recommend using IP addresses when installing and configuring Tableau Server because this simplifies reconfiguration if any of the IP addresses for the nodes changes. For more information about how to update a Tableau Server configuration for a new IP address, see Update Configuration for a New IP Address.

1. On the primary, open a command prompt as an administrator and navigate to the Tableau Server bin directory:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

2. Stop the server:
3. **Issue the `failoverprimary` command.**

Enter the following command, using either the computer names for the current and backup primaries (recommended) or the IPv4 addresses for the current and backup primaries. Separate multiple computer names or IPv4 addresses with a comma and no spaces:

```
tabadmin failoverprimary --primary "primary1_name,primary2_name"
```

or

```
tabadmin failoverprimary --primary "primary1_IP,primary2_IP"
```

For example, if the computer name of the current primary is `TABLEAU_SERVER` and the computer name of the backup primary is `TABLEAU_SERVER2`, you would enter the following:

```
tabadmin failoverprimary --primary "TABLEAU_SERVER,TABLEAU_SERVER2"
```

Here's a command example that uses IPv4 addresses. This example assumes that your primary (`primary1_IP`) has a single IPv4 address of 10.32.139.22 and your backup primary (`primary2_IP`) has a single IPv4 address of 10.32.139.26:

```
tabadmin failoverprimary --primary "10.32.139.22,10.32.139.26"
```

If the primary and backup primary have multiple IPv4 addresses, enter them all. For example:
tabadmin failoverprimary --primary
"10.32.139.22,10.32.139.23,10.32.139.26,10.32.139.27"

4. Next, copy the following from the primary and save them to a temporary location on your backup primary computer:

- The tabsvc.yml file, located in ProgramData\Tableau\Tableau Server\config
- The tabsvc folder, located in ProgramData\Tableau\Tableau Server\config

You need to use these if you switch to your backup primary (failover).

**Important**: The tabsvc.yml file contains server configuration settings. It gets updated when you change your configuration settings in the Tableau Server Configuration utility or using tabadmin commands. The tabsvc folder contains the keystore for securing server secrets. The key store and the tabsvc configuration file get updated when you regenerate encrypted secrets using the tabadmin regenerate internal_tokens command. If you change any configuration values or regenerate encrypted secrets after making copies of the tabsvc.yml file and tabsvc folder, you need to recopy these to your backup primary and edit the tabsvc.yml file to ensure you have the latest configurations if you need to failover.

5. On your backup primary, edit the copy of the tabsvc.yml file and replace all occurrences of the computer name or IP address(es) for the primary with the computer name or IP address(es) for the backup primary (the computer you’re currently on). If the primary is only running the gateway, as described in this procedure, the only line you’ll need to edit is worker.hosts.
6. Install Tableau Server on the backup primary. Use the same product key or keys that you used for license activation, and the same Run As account and configuration settings that you used on your primary.
**Note**: Installing Tableau Server will create a fresh `tabsvc.yml` file and `tabsvc` folder on the backup primary. If you need to failover to the backup, replace these with the copies you made and updated in Steps 4 and 5 above. To see how to do that, see Switch to Backup Primary.

7. After Setup completes, **stop the server** on the backup primary.

8. Still on your backup primary, enter the following command to disable the automatic starting of the Tableau Server service:

   ```
tabadmin autostart off
   ```

9. Commit the configuration change:

   ```
tabadmin config
   ```

You’ve finished creating a backup primary. See Switch to Backup Primary for what to do if your current primary fails.

If you are working in a test environment, this would be a good time to test your configuration by powering down your current primary to simulate a system failure.

Switch to Backup Primary

If your primary node fails, and you have a backup primary configured, follow these steps to switch to your backup primary. All steps should be performed on the backup primary computer.

1. On your backup primary, locate the `tabsvc.yml` file and `tabsvc` folder you copied and edited in steps 4 and 5 of Create a Backup Primary and copy these from your temporary location to `ProgramData\Tableau\Tableau Server\config` and replace the existing `tabsvc.yml` file and `tabsvc` folder on the backup primary. You need to do this so the backup primary has the same configuration settings as the primary did.
2. If web data connectors were imported to the primary server, copy them to the following folder on the backup primary:

C:\ProgramData\Tableau\Tableau Server-data\tabsvc\httpd\htdocs\webdataconnectors

Copy the web data connectors from the location from which they were imported to the primary server, or extract the contents of a Tableau Server .tsbak backup file and get them from there.

3. Open a command prompt as an administrator and navigate to the Tableau Server bin directory:

C:\Program Files\Tableau\Tableau Server\10.2\bin

4. Enter the following command:

`tabadmin config`

5. Enter the following command, using either the computer name (recommended) or the IPv4 address(es) of your backup primary (soon to be your new primary) and of your original primary (soon to be your backup primary). Separate multiple computer names or IPv4 addresses with a comma and no spaces.

`tabadmin failoverprimary --primary "primary2_name,primary1_name"`

or

`tabadmin failoverprimary --primary "primary2_IP,primary1_IP"`

For example, if the computer name of the backup primary is `TABLEAU_SERVER2` and the name of the original primary is `TABLEAU_SERVER`, you would enter the following:
Here's an example that uses IPv4 addresses. This example assumes that your backup primary (primary2_IP) has a single IPv4 address of 10.32.139.26 and your original primary (primary1_IP) has a single IPv4 address of 10.32.139.22:

```
tabadmin failoverprimary --primary "10.32.139.26,10.32.139.22"
```

If the backup primary and original primary have multiple IPv4 addresses, enter them all. For example:

```
tabadmin failoverprimary --primary "10.32.139.26,10.32.139.27,10.32.139.22,10.32.139.23"
```

6. Enter the following command:

```
tabadmin autostart on
```

7. Enter the following command to commit the configuration change:

```
tabadmin config
```

8. **Start the server.** Your backup primary is now your primary. When you look at the Status page, you should see that the IP address or computer name for the primary has changed:

![Server Status](image)
9. Your original primary is now your backup primary.

Security

Authentication

Authentication verifies a user’s identity. Everyone who needs to access Tableau Server—whether to manage the server, or to publish, browse, or administer content—must be represented as a user in the Tableau Server identity store. The method of authentication may be performed by Tableau Server (“local authentication”), or authentication may be performed by an external process. In the latter case, you must configure Tableau Server for external authentication technologies such as Active Directory, SAML, or OpenID. In all cases, whether authentication takes place locally or is external, each user identity must be represented in the Tableau Server identity store, which is managed by the repository.

Access and management permissions are implemented through site roles. Site roles define which users are administrators, and which users are content consumers and publishers on the server. For more information about administrators, site roles, groups, Guest User, and user-related administrative tasks, see Users and Site Roles for Users.

**Note:** In the context of authentication, it’s important to understand that users are not authorized to access external data sources through Tableau Server by virtue of having an account on the server. In other words, in the default configuration, Tableau Server does not act as a proxy to external data sources. Such access requires additional configuration of the data source on Tableau Server or authentication at the data source when the user connects from Tableau Desktop.

User identity in Tableau Server

When you install Tableau Server, you must select the process that the server will use to manage user authentication: local authentication or Active Directory. Before you install Tableau Server, you should understand how these two options impact your overall authentication strategy. After you select and set the authentication process, Tableau Server will configure
the various components for the authentication method that you have selected. After this configuration is complete, you cannot change the authentication method. In fact, to change this configuration, you must uninstall the server, delete the configuration on the computer, and then reinstall the server.

Local authentication

If the server is configured to use local authentication, then the Tableau Server identity store is used exclusively to authenticate users. When users sign-in and enter their credentials, either through Tableau Desktop, tabcmd, API, or web client, Tableau Server verifies the credentials.

To enable this scenario, you must first create an identity for each user. To create an identity, you specify a username and a password. To access or interact with content on the server, users must also be assigned a site role. User identities can be added to Tableau Server in the server UI, using tabcmd Commands, or using the REST API.

You can also create groups in Tableau Server to help manage and assign roles to large sets of related user groups (e.g., “Marketing”).

Use local authentication if any of the following are true:

- Your organization does not manage users with Active Directory
- You do not want to use Active Directory
- You want to use OpenID for authentication and single sign-on

When you configure Tableau Server for local authentication, you cannot set password policies or account lockout on failed password attempts. If you require these account safeguards, then you should use Active Directory authentication.

Active Directory

If Tableau Server is configured to use Active Directory authentication, then credentials are managed and verified by Active Directory. When a user logs onto Tableau Server from Tableau Desktop or a web client, the credentials are passed through to Active Directory, which then verifies them and sends an access token to Tableau Server. Tableau Server will
then manage user access to Tableau resources based on the site roles stored in the local identity store.

In this scenario, Tableau Server must be installed in a domain in Active Directory. Tableau Server will sync user and group metadata from Active Directory to the identity store. You do not have to manually add users. However, after the data is synchronized, you will need to assign site and server roles. You can assign these individually, or at the group level. Tableau Server does not synchronize any data back to Active Directory. Tableau Server manages content and server access according to the site role permission data is stored in the repository.

If you are already using Active Directory to manage users in your organization, then we recommend selecting Active Directory authentication during Tableau setup to make user provisioning and management easier. For example, by synchronizing Active Directory groups, you can set minimum site role Tableau permissions for users that are synchronized in the groups. You can synchronize specific Active Directory groups, or you can synchronize them all. For more information, see Synchronize All Active Directory Groups on the Server.

Be sure to review User Management in Active Directory Deployments to understand how multiple domains, domain naming, NetBIOS, and Active Directory user name format influence Tableau user management.

**Single sign-on options for Tableau Server**

Tableau Server supports several types of single sign-on (SSO) solutions. With SSO, users don’t have to explicitly sign in to Tableau Server. Instead, the credentials they’ve used to authenticate already (for example, by signing in to your corporate network) are used to authenticate them to Tableau Server, and they can skip the step of entering a username and password to access Tableau Server. With SSO, the user’s identity as established externally is mapped to a user identity defined in the Tableau Server identity store.

When you configure Tableau Server to use an SSO solution, all authentication is handled by the SSO solution. However, Tableau Server will manage user access to Tableau resources based on the site roles stored in the identity store.
Tableau Server supports these types of SSO:

- **SAML.** You can configure Tableau Server to use SAML (security assertion markup language) for SSO. With SAML, an external identity provider (IdP) authenticates the user’s credentials, and then sends a security assertion to Tableau Server that provides information about the user’s identity.

  You can use SAML to access Tableau Server if you have configured Active Directory or local authentication on Tableau Server. For more information, see SAML.

- **Kerberos.** If Kerberos is enabled in your environment and if the server is configured to use Active Directory authentication, you can provide users with access to Tableau Server based on their Windows identities. You cannot use Kerberos if your Tableau Server is configured for local authentication. For more information, see Kerberos.

- **OpenID.** OpenID Connect is a standard authentication protocol that lets users sign in to an identity provider (IdP) such as Google. After they’ve successfully signed in to their IdP, they are automatically signed in to Tableau Server. To use OpenID Connect on Tableau Server, the server must be configured to use local authentication. Active Directory authentication is not supported. For more information, see OpenID Connect.

- **Trusted Authentication.** Trusted authentication lets you set up a trusted relationship between Tableau Server and one or more web servers. When Tableau Server receives requests from a trusted web server, it assumes that the web server has already handled whatever authentication is necessary. Tableau Server receives the request with a redeemable token or ticket and presents the user with a personalized view which takes into consideration the user’s role and permissions. For more information, see Trusted Authentication.

- **Integrated Windows Authentication.** If you have configured Tableau Server with Active Directory authentication, you can enable automatic logon. Automatic logon uses Microsoft SSPI to sign in your users based on their Windows username and password. Users are not prompted for credentials, which creates an experience
similar to single sign-on (SSO). To enable automatic login see, Configure General Server Options.

Related topics

- Trusted Authentication
- REST API: Signing In and Out (Authentication)

SAML

SAML (Security Assertion Markup Language) is an XML standard that allows secure web domains to exchange user authentication and authorization data. You can configure Tableau Server to use an external identity provider (IdP) to authenticate Tableau Server users over SAML 2.0. This allows you to provide a single sign-on experience for your users across all the applications in your organization.

These are the options for configuring SAML with Tableau Server:

- **Server-wide SAML authentication.** All server users authenticate with the same SAML IdP.

- **Server-wide local authentication and site-specific SAML authentication.** The users from one or more sites on Tableau Server authenticate with one or more SAML IdPs. Each site can use a different IdP. In this option, users who are not configured to use SAML can sign in using local authentication.

- **Server-wide SAML authentication and site-specific SAML authentication.** All users authenticate with a SAML IdP. There is a default SAML IdP for users that belong to multiple sites. Each site can use a different IdP.

User authentication is performed by the SAML IdP, not by Tableau. SAML does not handle permissions and authorization having to do with Tableau Server content, such as workbooks.
Note: Tableau Server supports both service provider initiated and IdP initiated SAML. However, if you connect to Tableau Server from Tableau Desktop or Tableau Mobile, it is a service provider initiated connection.

Quick Start: Single Sign-On with SAML

With Tableau’s SAML support, you use one or more external identity providers (IdP) to authenticate Tableau Server users. This quick start describes how to set up a server-wide SAML implementation that uses a single IdP.

To configure Tableau Server for SAML, you need the following:

- **Certificate file**: A PEM-encoded x509 certificate that has a .crt filename extension.
- **Certificate key file**: An RSA or DSA key file that is not password protected and that has a .key filename extension.
- **IdP account**: Examples are PingFederate, SiteMinder, and OpenAM.
- **Matching usernames**: Tableau Server usernames and the usernames stored in the IdP must match. Ensure that the username you plan to use for your Tableau Server administrator account exists with your IdP before you run setup.

1 Specify the Server and Certificates

Run Tableau Server setup. After you configure your general settings in the Configuration utility, click the **SAML** tab and select **SAML authentication for the server**:
In the **Tableau Server return URL** box, enter the customer-facing URL for your installation of Tableau Server. Enter the same value for **SAML entity ID**.

Create a folder named **SAML** under the following folder, and then copy the .crt and .key files to the new folder.

C:\Program Files\Tableau\Tableau Server

Use the new folder for the **SAML certificate file** and **SAML key file** boxes.

2 Export Metadata from Tableau

Leaving the **SAML IdP metadata file** box empty, click the **Export Metadata File** button.
Use the .xml file name of your choice.

In the next dialog box, save the XML file. You will need to provide this file to your IdP in the next step.

3 Export Metadata from the IdP

On the IdP’s website, add your installation of Tableau Server as a connection type for the IdP to authenticate. As part of this, you import the Tableau metadata .xml file you created in step 2, and confirm that your IdP’s settings use **username** as the attribute element to verify.

Next, export your IdP’s metadata .xml file and copy it to the following folder on the computer where Tableau Server is installed:

C:\Program Files\Tableau\Tableau Server\SAML

4 Test the SAML Sign-On

On the **SAML** tab in the Tableau Configuration utility, enter the location of the IdP’s file in the **SAML IdP metadata** box. Click OK. Finish the setup process.
To test your changes, start a new web browser session and go to the URL for your installation of Tableau Server. If SAML is properly configured, the Sign On prompt is from your IdP and not from Tableau:

![Sign On Prompt](image)

How SAML Authentication Works

SAML (Security Assertion Markup Language) is an XML open-standard for exchanging authentication information between a service provider and an identity provider (IdP). You can use a third-party IdP to authenticate users and to pass identity information to the service provider in the form of a digitally signed XML document. Tableau Server is a service provider. Examples of IdPs include PingOne and OneLogin.

When you use a trusted IdP for the SAML connection, you can provide a single sign-on (SSO) experience, in which your users can access their web applications, including Tableau Server, through one set of credentials. In this environment, only the IdP has access to users’ credentials.

Tableau supports authentication initiated by the service provider and the IdP. In service provider initiated authentication, your users navigate to Tableau and are redirected to the IdP for authentication. In IdP initiated authentication, your users authenticate with the IdP first and then navigate to Tableau.

You can configure SAML authentication with Tableau Server using one of the following options:
- Server-wide SAML authentication. All server users authenticate with the same SAML IdP.

- Server-wide local authentication and site-specific SAML authentication. The users from one or more sites on Tableau Server authenticate with one or more SAML IdPs. Each site can use a different IdP. In this option, users who are not configured to use SAML can sign in using local authentication.

- Server-wide SAML authentication and site-specific SAML authentication. All users authenticate with a SAML IdP. There is a default SAML IdP for users that belong to multiple sites. Each site can use a different IdP.

User authentication is performed by the SAML IdP, not by Tableau. SAML does not handle permissions and authorization having to do with Tableau Server content, such as workbooks.

The following image shows the steps to authenticate a user with single sign-on in a typical service provider initiated flow:

1. User navigates to the Tableau Server sign-in page or a published workbook, and enters the user name.
Tableau Server starts the authentication process and redirects the request to the registered IdP.

The IdP requests the user’s password and, after confirming that the user name submitted is identical to the user name stored in the IdP assertions, authenticates the user.

The IdP returns a SAML success response to Tableau Server.

Tableau Server displays the page the user requested in step 1.

SAML Requirements

Before you configure SAML for Tableau Server, ensure that you meet the following requirements:

Certificate and identity provider (IdP) requirements

To configure Tableau Server for SAML, you need the following:

- **Certificate file.** A PEM-encoded x509 certificate file with a .crt extension. This file is used by Tableau Server, not the IdP. If you have an SSL certificate, you can use the same certificate with SAML. See About the Certificate File later in this topic for details.

- **Certificate key file.** An RSA or DSA private key file that is not password protected, and which has the .key extension. This file is used by Tableau Server, not the IdP. The certificate key file must not have the passphrase. If you have an SSL certificate key file, you can use it for SAML as long as it does not have a passphrase. See About the Certificate File later in this topic for details.

- **IdP account that supports SAML 2.0 or later.** You need an account with an external identity provider. Some examples are PingFederate, SiteMinder, and OpenAM. The IdP must support SAML 2.0 or later.

- **IdP provider that supports import and export of XML metadata.** Although a
manually created metadata file may work, Tableau Software Technical Support cannot assist with generating the file or troubleshooting it.

About the certificate file and key files

If you are using a PEM-encoded x509 certificate file for SSL, you can use the same file for SAML. When it’s used for SSL, the certificate file is used to encrypt traffic. When it’s used for SAML, the certificate is used for authentication.

Tableau Server does not support certificate and certificate key files for SAML if the certificate/key require a chain file. If your SSL certificate and certificate key file require a chain file, you need to generate a new certificate and key file to use for SAML.

User management requirements

When you configure SAML, the authentication is performed by the IdP outside of Tableau. However, the user management is performed either by Active Directory or by Tableau Server (which is called local authentication even though Tableau Server does not perform authentication when configured with SAML).

Note: The REST API and tabcmd do not support authentication with SAML single-sign (SSO). To sign in, you must specify the name and password of a user who has been created on the server. The user could have a local or Active Directory account, depending on how you have configured Tableau Server. For Tableau Online, you can specify the TableauID credentials of the user. You will have the permissions of the user that you’re signed in as.

When you configure user authentication on the General tab of Tableau Server Configuration utility, you must choose an option that is correct for how you want to use SAML:

- **For site-specific SAML:** If you want different sites on Tableau Server to authenticate with different SAML IdPs, configure Tableau Server to use local authentication
rather than Active Directory. When using site-specific SAML, Tableau Server relies on the IdP for authentication and does not use any passwords when authenticating.

- **For server-wide SAML**: If you configure server-wide SAML with a single IdP, you can configure Tableau Server to use local authentication or Active Directory for user management. However, if you select Active Directory, you must disable the **Enable automatic logon** option.

SAML compatibility requirements and notes

Note the following about using SAML with Tableau Server:

- **No Kerberos**: Tableau Server does not support SAML and Kerberos together.

- **No mutual SSL**: Tableau Server does not support mutual SSL (two-way SSL) and SAML together, whether it is server-wide SAML or site-specific SAML. If you want to use mutual SSL, you can configure mutual SSL on the IdP side rather than on the Tableau Server side.

- **No encrypted assertions for site-specific SAML**: For site-specific SAML, Tableau Server does not support encrypted SAML assertions from the IdP. However, all SAML requests and responses are sent over HTTPS.

- **User identity in Tableau Server for tabcmd users**: To use tabcmd with the server, users must sign in to the server using the credentials of a user defined on the server; you cannot use SAML accounts with tabcmd. An initial system administrator user is created when the server is first installed and configured.

- **IdP provider that uses forms-based authentication**: Tableau Desktop supports signing in with SAML. However, your IdP must support forms-based authentication. Otherwise, you can disable SAML for Tableau Desktop with the `wgserver.authentication.desktop_nosaml` command. See tabadmin set options for more information.

- **Distributed installations**: Clusters configured for SAML must have the same SAML
certificate, SAML key, and SAML IdP metadata files on each Tableau Server that’s running an Application Server process. See Configure a Server Cluster for SAML for details.

- **Login URL**: For users to be able to sign in, your IdP must be configured with SAML Login endpoint that sends a POST request to the following URL:

  http(s)://<tableauserver>/wg/saml/SSO/index.html.

- **Logout URL**: To enable users to sign out after signing in with SAML, your IdP must be configured with a SAML Logout endpoint that sends a POST request to the following URL:

  http(s)://<tableauserver>/wg/saml/SingleLogout/index.html.

- **PostLogout redirect URL**: By default, when a user signs out of Tableau Server, the sign-in page is displayed. To specify an alternate page to display after sign-out, use the `tabadmin set wgserver.saml.logout.redirect_url` command.

  - To specify an absolute URL, use a fully-qualified URL starting with `http://` or `https://`, as in this example:

    `tabadmin set wgserver.saml.logout.redirect_url http://example.com`

  - To specify a URL relative to the Tableau Server host, use a page starting with a `/` (slash):

    `tabadmin set wgserver.saml.logout.redirect_url /our-logoutpage.html`

- **Active Directory Federation Service (AD FS)**: You must configure AD FS to return additional attributes for Tableau authentication with SAML. The **Name ID** and **username** attributes can be mapped to the same AD attribute: **SAM-Account-Name**. For configuration information, see Configure SAML with AD FS on Tableau
Server.

Requirements for connecting from Tableau Desktop

When you configure SAML for Tableau Server, users with SAML credentials can also sign into Tableau Server from Tableau Desktop. It is recommended that the version of Tableau Desktop match the version of Tableau Server for full compatibility. Note that if you connect to Tableau Server from Tableau Desktop or Tableau Mobile, it is a service provider initiated connection.

Note: To connect with site-specific SAML, users must run Tableau Desktop 10.0 or later.

XML data requirements

You configure SAML using XML metadata documents that are generated by Tableau Server and by your IdP. During the authentication process, the IdP and Tableau Server exchange authentication information using XML documents. To be sure that the XML that's used for SAML configuration and SAML-based authentication works correctly, review the following requirements. If the XML does not meet these requirements, errors can occur when you configure SAML or when users try to sign in.

- **HTTP POST**: Tableau Server only accepts HTTP POST requests for SAML communications. HTTP Redirect is not supported.

The SAML metadata XML document that is exported by Tableau Server should contain the following elements, with the Binding attribute set to HTTP-POST.

- Verify the following element which specifies the URL that the IdP redirects to after successful authentication:

  ```xml
  <md:AssertionConsumerService Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
  Location="http(s)://TABLEAU-
  ```
Verify the following element which specifies the URL that the IdP will use for the logout endpoint:

```xml
```

Verify the following element which specifies the URL for signin in:

```xml
```

Attribute named **username**: You must configure your identity provider to return an assertion that includes the `username` value in the `saml:AttributeStatement` element in a format like the following example. Make sure that the attribute is typed as `xs:string`. (It should **not** be typed as `xs:any`.)

```xml
<saml:Assertion assertion-element-attributes>
  <saml:Issuer>issuer-information</saml:Issuer>
  <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
    ...
  </Signature>
  <saml:Subject>
    ...
  </saml:Subject>
  <saml:Conditions condition-attributes>
```
To change the SAML attribute that the username value is passed in, use the `tabadmin set` command to set the `wgserver.saml.idpattribute.username` value to a different attribute name. You must change the attribute if you use a global ID. The attribute name is case-sensitive.

- **Matching usernames:** Tableau Server usernames and the usernames stored in the IdP must match. For example, if the username for Jane Smith is stored in PingFederate as `jsmith`, it must also be stored in Tableau Server as `jsmith`. If you are configuring SAML as part of Tableau Server setup, part of setup is creating the Tableau Server administrator account. Before you run setup, make sure that the account you plan to use exists in your IdP.
If you are using Active Directory authentication with Tableau Server and have multiple Active Directory domains (that is, users belong to multiple domains, or your Tableau Server installation includes multiple domains), the IdP must send both the domain and username for a user, and these must match the user exactly in Tableau Server. While these can be sent either as `domain/username` or `username@domain.com, we recommend using the `domain/username` format. See User Management in Active Directory Deployments for more information.

Configure Server-Wide SAML

Configure server-wide SAML when you want users on Tableau Server to authenticate with a single SAML identity provider (IdP). For information about authenticating users with different IdPs for different sites on Tableau Server, see Configure Site-Specific SAML.

Before you configure Tableau Server for SAML, make sure you meet the SAML Requirements.

To configure Tableau Server to use server-wide SAML:

1. Place the certificate files in a folder named SAML, parallel to the Tableau Server 10.2 folder. For example:

   C:\Program Files\Tableau\Tableau Server\SAML

   You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

2. If you are configuring SAML during Tableau Server setup, go to the SAML tab in the configuration utility.

   If you are configuring SAML after you installing Tableau Server, open the Tableau Server Configuration Utility (Start > All Programs > Tableau Server 10.2 > Configure Tableau Server) and then click the SAML tab.

3. On the SAML tab, select **SAML authentication for the server** and provide the
location for each of the following:

**Tableau Server return URL**—The URL that Tableau Server users will be accessing, such as http://tableau_server. Using http://localhost is not recommended. Using a URL with a trailing slash (for example, http://tableau_server/) is not supported.

**SAML entity ID**—The entity ID uniquely identifies your Tableau Server installation to the IdP. You can enter your Tableau Server URL again here, if you like, but it does not have to be your Tableau Server URL.

**SAML certificate file**—A PEM-encoded x509 certificate with the file extension .crt. This file is used by Tableau Server, not the IdP.

**SAML certificate key file**—An RSA or DSA private key file that is not password protected, and that has the file extension .key. This file is used by Tableau Server, not the IdP.

4. Leave the **SAML IdP metadata file** text box empty for now and click **Export Metadata File**.

   A dialog box opens that allows you to save Tableau Server’s SAML settings as an XML file. At this point, metadata from your IdP is not included.

5. Save the XML file with the name of your choice.

6. On your IdP’s website or in its application:
   
   - Add Tableau Server as a Service Provider. Refer to your IdP’s documentation for information about how to do this. As part of the process of configuring Tableau Server as a Service Provider, you will import the file you saved in step 5.
   
   - Confirm that your IdP uses **username** as the attribute element to verify.

7. Still within your IdP, export your IdP’s metadata XML file.
It's a good idea to verify that the metadata XML you get from the IdP includes a `SingleSignOnService` element in which the binding is set to `HTTP-POST`, as in the following example:

```xml
```

8. Copy your IdP's metadata XML file to the following folder on the computer where Tableau Server is installed:

   `C:\Program Files\Tableau\Tableau Server\SAML`

9. On the SAML tab in the Tableau Server Configuration dialog box, enter the location to the file in the SAML IdP metadata file text box:

10. Click **OK**. Tableau Server is now configured for SAML authentication.
Configure a Server Cluster for SAML

When you configure a Tableau Server cluster to use SAML, you place the same SAML certificate, SAML key, and SAML IdP metadata files on every computer that's running a Tableau application server process (also known as vizportal.exe). To configure a Tableau Server cluster to use SAML:

1. Configure the primary Tableau Server as described in the procedure above.

2. Place the same SAML certificate, SAML key, and SAML IdP metadata files that you used for the primary on each Tableau Worker that is running an application server process. Use the same folder location on the workers that you used on the primary. You do not need to do any additional configuration on the workers.

For example, consider a cluster that includes a primary Tableau Server and two workers. Application server processes are running on the primary and on Worker 2 and Worker 3. In this situation, you configure the primary Tableau Server for SAML, and then copy the same SAML certificate, SAML key, and SAML IdP metadata files to the Worker 2 and Worker 3 computers. On the worker computers, put the SAML files in the C:\Program Files\Tableau\Tableau Server\SAML folder, just as they are on the primary computer.

Test Your Configuration

Test your SAML configuration by opening a new web browser instance and typing the Tableau Server name in the URL window:
You should note that the sign in prompt that appears is from your IdP and not Tableau Server:

![Sign In Prompt]

Configure Site-Specific SAML

Configure site-specific SAML when you want each site on Tableau Server to use a different SAML identity provider (IdP). Because each SAML IdP can be site-specific, you must also configure a server-wide authentication method for users that do not belong to a site, or that belong to multiple sites. The server-wide default authentication method is configured in the Tableau Server Configuration utility and can be set to either local authentication or to server-wide SAML authentication.

If there is only one site on Tableau Server, the Default site, then you must use server-wide SAML. For more information, see Configure Server-Wide SAML.

To configure Tableau Server to use site-specific SAML, you must complete the following high-level steps. Details about each step appear later in this topic.
1. Use the Tableau Server Configuration utility to perform one of the following tasks:
   - Configure site-specific SAML with local authentication
   - Configure site-specific SAML with server-wide SAML using local authentication

2. Enable SAML for a site

3. Configure SAML for a site

**Important**: Before you configure Tableau Server for SAML, make sure you meet the SAML Requirements. For example, you cannot use Active Directory with site-specific SAML, you must get certificate files, and you must ensure that your IdP provider meets the necessary requirements.

Configure site-specific SAML with local authentication

1. If you are configuring SAML during Tableau Server setup, go to the SAML tab in the configuration utility.

   If you are configuring SAML after Tableau Server has been installed, open the Tableau Server Configuration Utility (Start > All Programs > Tableau Server 10.2 > Configure Tableau Server) and then click the SAML tab.

2. On the SAML tab, select the **Site-specific SAML authentication only** option.

3. Place the certificate files that you want to use in a folder named SAML at the same level as the Tableau Server 10.2 folder. For example:

   C:\Program Files\Tableau\Tableau Server\SAML

   You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

4. Provide the location for each of the following:
• **Tableau Server return URL**—The URL that Tableau Server users enter in their browser to access the server, such as `http://tableau_server`. Using `http://localhost` will not work for an external-facing server. Using a URL with a trailing slash (for example, `http://tableau_server/`) is not supported.

• **SAML entity ID**—Typically the same as the Tableau Server return URL. The entity ID that you enter is used as a base for generating site-specific entity IDs. For example, if you enter `http://tableau_server`, a site configured for site-specific SAML might display the following entity ID:

```text
http://tableau_server/
/samlservice/public/sp/metadata?alias=48957410-9396-430a-967c-75bdb6e002a0
```

• **SAML certificate file**—A PEM-encoded x509 certificate (a file with the extension `.crt`). This file is used by Tableau Server, not the IdP.

• **SAML certificate key file**—An RSA or DSA private key file that is not password protected, and that has the file extension `.key`. This file is used by Tableau Server, not the IdP.

5. Click **OK**.

Continue to Enable SAML for a site.

Configure site-specific SAML with server-wide SAML using local authentication

1. If you are configuring SAML during Tableau Server setup, go to the **SAML** tab in the configuration utility.

   If you are configuring SAML after Tableau Server has been installed, open the Tableau Server Configuration Utility (**Start > All Programs > Tableau Server 10.2 > Configure Tableau Server**) and then click the **SAML** tab.

2. On the **SAML** tab, select the **SAML authentication for the server and for sites**
option.

3. Place the certificate files that you want to use in a folder named SAML that's at the same level as the Tableau Server 10.2 folder. For example:

C:\Program Files\Tableau\Tableau Server\SAML

You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

4. Provide the location for each of the following:

   - **Tableau Server return URL**—The URL that Tableau Server users enter in their browser to access the server, such as http://tableau_server. Using http://localhost will not work for an external-facing server. Using a URL with a trailing slash (for example, http://tableau_server/) is not supported.

   - **SAML entity ID**—The entity ID that uniquely identifies your Tableau Server installation to the IdP. This is typically the same as the Tableau Server return URL. Additionally, the entity ID that you enter is used as a base for generating site-specific entity IDs. For example, if you enter http://tableau_server, a site configured for site-specific SAML might display the following entity ID:

     http://tableau_server-/samlservice/public/sp/metadata?alias=48957410-9396-430a-967c-75bdb6e002a0

   - **SAML certificate file**—A PEM-encoded x509 certificate (a file with the extension .crt). This file is used by Tableau Server, not the IdP.

   - **SAML certificate key file**—An RSA or DSA private key file that is not password protected, and that has the file extension .key. This file is used by Tableau Server, not the IdP.
5. Leave the SAML IdP metadata file box empty for now and click Export Metadata File.

A dialog box opens that allows you to save Tableau Server's SAML settings as an XML file. At this point, metadata from your IdP is not included.

6. Save the XML file. You can give the file any name you want.

7. On your IdP’s website or in its application:
   - Add Tableau Server as a Service Provider. Refer to your IdP’s documentation for information about how to do this. As part of the process of configuring Tableau Server as a Service Provider, you will import the file that you just exported from Tableau Server.
   - Confirm that your IdP uses username as the attribute element to verify.

8. Still within your IdP, export your IdP’s metadata XML file.

   It’s a good idea to verify that the metadata you get from the IdP includes a SingleSignOnService element in which the binding is set to HTTP-POST, as in the following example:


9. Copy your IdP’s metadata XML file to the following folder on the computer where Tableau Server is installed:

   C:\Program Files\Tableau\Tableau Server\SAML

   You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.
10. On the **SAML** tab in the Tableau Server Configuration dialog box, enter the location of the file in the **SAML IdP metadata file** box:

![Tableau Server Configuration dialog box]

11. Click **OK**. Tableau Server is now configured for SAML authentication.

   Continue to the next step, Enable SAML for a site.

**Enable SAML for a site**

1. Sign in to Tableau Server as a site administrator.

2. If you have more than one site for Tableau Server, select the site for which you want to enable SAML in the sites drop-down.

3. Click **Settings**.
4. Click the **Authentication** tab.

![Tab Switch](image)

**Note:** If you do not see the **Authentication** tab, ensure that Tableau Server contains more than one site.

5. On the **Authentication** tab, select **Use site-specific SAML**.

Continue to Configure SAML for a site.

Configure SAML for a site

This section corresponds to and supplements the steps shown on the Authentication page in Tableau Server.

**Note:** To complete this process, you will also need the documentation your IdP provides. Look for topics that refer to configuring or defining a service provider for a SAML connection.

To display all collapsed content, click the (Expand all) button at the top of the page.

**Step 1: Export metadata from Tableau Server**

To create the SAML connection between Tableau Server and your IdP, you need to exchange required metadata between the two services. To get metadata from Tableau Server, do either of the following:
• Select **Export metadata** to download an XML file that contains the Tableau Server SAML entity ID, Assertion Consumer Service (ACS) URL, and X.509 certificate. Note that the entity ID is site-specific and generated from the entity ID that you entered into the Tableau Server Configuration utility. For example, if you entered `http://tableau_server` into the Tableau Server Configuration utility, you might see the following entity ID for the site:

  `http://tableau_server/samlservice/public/sp/metadata?alias=48957410-9396-430a-967c-75bdb6e002a0`

• Select **Download signing and encryption certificate** if your IdP expects the required information in a different way. For example, if it wants you to enter the Tableau Server entity ID, ACS URL, and X.509 certificate in separate locations. See the IdP’s SAML configuration steps to confirm the correct option.

**Steps 2 and 3: External steps**

For Step 2, to import the metadata you exported in step 1, sign in to your IdP account, and use the instructions provided by the IdP’s documentation to submit the Tableau Server metadata.
For Step 3, the IdP’s documentation will guide you also in how to provide metadata to a service provider. It will instruct you to download a metadata file, or it will display XML code. If it displays XML code, copy and paste the code into a new text file, and save the file with an .xml extension.

**Step 4: Import metadata to Tableau Server**

On the Authentication page in Tableau Server, import the metadata file that you downloaded from the IdP or configured manually from XML it provided.

**Step 5: Match attributes**

Attributes contain authentication, authorization, and other information about a user. In the **Identity Provider (IdP) Assertion Name** column, provide the attributes that contain the information Tableau Server requires.

- **Username or Email**: (Required) Enter the name of the attribute that stores user names or email addresses.

- **Display name**: (Optional but recommended) Some IdPs use separate attributes for first and last names, and others store the full name in one attribute.

  Select the button that corresponds to the way your IdP stores the names. For example, if the IdP combines first and last name in one attribute, select **Display name**, and then enter the attribute name.

**Step 6: Manage users**

Select existing Tableau Server users, or add new users you want to approve for single sign-on.
When you add or import users, you also specify their authentication type. On the Users page, you can change users’ authentication type any time after adding them.

**Important:** Users that authenticate with site-specific SAML can only belong to one site. If a user needs to belong to multiple sites, set their authentication type to the server default. Depending on how site-specific SAML was configured by the server administrator, the server default is either local authentication or server-wide SAML.

**Step 7: Troubleshooting**

Start with the troubleshooting steps suggested on the Authentication page. If those steps do not resolve the issues, see Troubleshoot SAML.

**Default authentication type for embedded views**

Part of enabling SAML on your site is to specify how users sign in to access views embedded in web pages:

- **Allow users to choose their authentication type**

  When you select this option, two sign-in options appear where a view is embedded: a sign-in button that uses single sign-on authentication and a link to use TableauID as an alternative.

  With this option, users need to know which alternative to choose. As part of notification you send your users after you add them to the single sign-on site, let them know which type of authentication to use for a variety of sign-in scenarios. For example, embedded views, Tableau Desktop, the Tableau Server sync client, Tableau Mobile, and so on.

- **TableauID**
This option requires users to sign in using a TableauID even if SAML is enabled on the site. Generally it’s reserved for administrators for troubleshooting issues with embedded views and SAML.

**• Single sign-on with SAML**

If your IdP doesn’t support signing in from an iframe, select **Authenticate in a separate pop-up window**. When a user goes to the web page with the embedded view, the pop-up window appears when they select the sign-in button.

If your IdP supports signing in from an iframe, select **Authenticate using an inline frame (less secure; not supported by all IdPs)**. Inline frame embedding may provide a more seamless user experience when signing-on to view embedded visualizations. For example, if a user is already authenticated with your identity provider and iFrame embedding is enabled, the user would seamlessly authenticate with Tableau Server when browsing to pages that contain an embedded visualizations.

**Caution:** Inline frames can be vulnerable to a clickjack attack. *Clickjacking* is a type of attack against web pages in which the attacker tries to lure users into clicking or entering content by displaying the page to attack in a transparent layer over an unrelated page. In the context of Tableau Server, an attacker might try to use a clickjack attack to capture user credentials or to get an authenticated user to change settings. For more information about clickjack attacks, see [Clickjacking](https://www.owasp.org/index.php/Clickjacking) on the Open Web Application Security Project website.

As when signing in to Tableau Server directly, the user is redirected to the IdP’s sign-in page to complete the authentication.

**Configure SAP HANA SSO**

You can configure Tableau Server to use SAML delegation to provide Single Sign-on (SSO) for SAP HANA. HANA SSO is not dependent on SAML authentication to Tableau.
Server. **Note:** You do not need to use SAML sign on with Tableau Server in order to use HANA SSO. You can sign in to Tableau Server using whatever method you choose.

With SSO for SAP HANA, Tableau Server functions as an Identity Provider (IdP) and this configuration allows you to provide a single sign-on experience for users making SAP HANA connections. As part of the configuration, you need to acquire a SAML certificate and key file for Tableau Server (these should be a public key certificate and private key). You need to also install the signed certificate in HANA. You can generate the certificate and key yourself, or get them from a Certificate Authority. For more information on generating a certificate/private key and configuring SAP HANA, see the Tableau Community.

**Note:** The SAP HANA driver version 1.00.9 or later must be installed on Tableau Server in order to use SSO for SAP HANA. The driver cannot encrypt the SAML assertion, so you may want to enable encryption for the SAML connections. For more information, see the Tableau Community.

Configure SSO for SAP HANA

To configure Tableau Server to use SSO for SAP HANA:

1. Place certificate files in a folder named SAML, parallel to the Tableau Server 10.2 folder. For example:

   ```
   C:\Program Files\Tableau\Tableau Server\SAML
   ```

   You should use this location because the user account that runs Tableau Server has the necessary permissions for accessing this folder.

2. After you install Tableau Server, run the Configuration utility (Start > All Programs > Tableau Server 10.2 > Configure Tableau Server), and then click the SAP HANA tab.

3. Select **Use SAML to enable single sign-on for SAP HANA** and provide the
location for each of the following:

**SAML certificate file**—A PEM-encoded x509 certificate with the file extension `.crt` or `.cert`. This file is used by Tableau Server, and must also be installed on HANA.

**SAML private key file**—A DER-encoded private key file that is not password protected, and that has the file extension `.der`. This file is only used by Tableau Server.

4. Select the format of the user name.

5. Select the case for the user name. This determines the case of the name when it is forwarded to the SAP HANA identity provider (IdP).

Configure SAML with AD FS on Tableau Server

Active Directory Federation Services (AD FS) allows cloud-based services to use Active Directory (AD) single sign-on (SSO), which is a common method for authentication behind
company firewalls. AD FS integrates with SAML, which is an authentication standard available in Tableau Server.

**Note:** These steps reflect a third-party application and are subject to change without our knowledge. If the steps described here do not match the screens you see in your IdP account, you can use the generic SAML configuration steps, along with the IdP's documentation.

Prerequisites

Before you can configure Tableau Server and SAML with AD FS, you must have:

- A server running Microsoft Windows Server 2008 R2 (or later) with AD FS 2.0 (or later) and IIS installed.

- The AD FS server must be accessible from outside your company firewall. We recommend that you secure your AD FS server (e.g. utilizing a reverse proxy). When your AD FS server is accessible from outside your firewall, Tableau Server can redirect users to the sign in page hosted by AD FS.

- A site administrator account that uses TableauID authentication. If SAML single sign-on fails, you can still sign in to Tableau Server as a site administrator.

- Certificates encrypted using the appropriate encryption method. Be sure to use a SHA-2 (256 or 512 bit) certificate. All major browsers will display warnings when connecting to SHA-1 certificates. By the end of 2017, it's likely that most browsers will no longer connect to servers that are presenting SHA-1 certificates.

Step 1: Configure SSL

The first step in configuring Tableau Server for AD FS is to configure SSL. For instructions, see Configure External SSL.
Note: If you don't already have an SSL certificate and key for your Tableau Server, you'll need to create one. For more information, see Example: SSL Certificate - Generate a Key and CSR. You'll need to have your certificate signed by a certificate authority (CA). The common name (CN) is used by AD FS and users, so be sure that it is the fully qualified domain name of your Tableau Server. If there are multiple ways to access the server (e.g., hostname, internal FQDN, external FQDN, etc.), the certificate CN must match the URL that users and AD FS use to talk to Tableau Server.

Step 2: Configure Server-Wide SAML

Next, configure server-wide SAML in Tableau Server. For instructions, see Configure Server-Wide SAML.

Step 3: Configure AD FS to accept sign in requests from Tableau Server

1. Import the Tableau Server XML metadata file into AD FS.
   a. To open the Add Relying Party Trust Wizard, do one of the following:

   Windows Server 2008 R2:
   i. Click Start, click to Administrative Tools, and then click AD FS 2.0.
   ii. In AD FS 2.0, under Trust Relationships, right-click the Relying Party Trusts folder, and then click Add Relying Party Trust.

   Windows Server 2012 R2:
   i. Open Server Manager, and then on the Tools menu, click AD FS Management.
   ii. In AD FS Management, on the Action menu, click Add Relying Party Trust.

   b. In the Add Relying Party Trust Wizard, click Start.
c. On the **Select Data Source** page, select **Import data about the relying party from a file**, and then click **Browse** to locate your Tableau Server XML metadata file. By default, this file is named **saml_sp_metadata.xml**.

d. Click **Next**, and then on the **Specify Display Name** page, in the **Display name** and **Notes** boxes, type a name and description for the relying party trust.

e. Click Next to skip the **Configure Multi-factor Authentication Now** page.

f. Click Next to skip the **Choose Issuance Authorization Rules** page.

g. Click Next to skip the **Ready to Add Trust** page.

h. On the **Finish** page, select the **Open the Edit Claim Rules dialog for this relying party trust when the wizard closes** check box, and then click **Close**.

i. In the **Edit Claim Rules** dialog box, click **Add Rule**.

2. In the **Add Transform Claim Rule Wizard**, add a claim rule to ensure the assertions sent by AD FS match with the assertions Tableau Server expects. At a minimum, Tableau Server needs an email address. However, including first and last names in addition to email will ensure the user names displayed in Tableau Server are the same as those in your AD account. To add a claim rule:

   a. On the **Choose Rule Type** page, in the **Claim rule template** drop-down list box, click **Send LDAP Attributes as Claims**, and then click **Next**.

   b. On the **Configure Claim Rule** page, in the **Claim rule name** box, name the claim rule anything that makes sense to you.

   c. In the **Attribute store** drop-down list box, click **Active Directory**, complete the mapping as shown below, and then click **Finish**.
The mapping is case sensitive and requires exact spelling, so double-check your entries.

<table>
<thead>
<tr>
<th>LDAP Attribute</th>
<th>Outgoing Claim Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-Principal-Name</td>
<td>Name ID</td>
</tr>
<tr>
<td>User-Principal-Name</td>
<td>email</td>
</tr>
<tr>
<td>Given-Name</td>
<td>firstName</td>
</tr>
<tr>
<td>Surname</td>
<td>lastName</td>
</tr>
</tbody>
</table>

3. After you add the claim rule, you'll export AD FS Federation metadata. You will import this file into Tableau Server in a later step. The file will be available at https://<adfs server name>/FederationMetadata/2007-06/FederationMetadata.xml

   • After you download the file, ensure that it is correctly encoded as UTF-8 without BOM. Otherwise, if the file does not have the correct encoding, the import into Tableau Server will fail. You can use text editors like Sublime Text or Note++ to open and save this file with the correct encoding, if necessary.

4. Ensure that AD FS is using forms-based authentication. Sign ins will be performed via a browser window, so you need AD FS to default to this type of authentication.

   • Edit c:\inetpub\adfs\ls\web.config, search for the tag , and move the line so it appears first in the list. Save the file so that IIS can automatically reload it.

   **Note:** If you don't see the c:\inetpub\adfs\ls\web.config file, IIS is not installed and configured on your AD FS server.

5. Next, configure an additional AD FS relying party identifier. This allows your system to work around any AD FS bug with SAML logout. Do one of the following:
Windows Server 2008 R2:

a. In AD FS 2.0, right-click on the relying party you just created for Tableau Server, and click Properties.

b. On the Identifiers tab, in the Relying party identifier box, enter https://sso.online.tableau.com/public/sp/metadata and then click Add.

Windows Server 2012 R2:

a. In AD FS Management, in the Relying Party Trusts list, right-click on the relying party you just created for Tableau Server, and click Properties.

b. On the Identifiers tab, in the Relying party identifier box, enter https://sso.online.tableau.com/public/sp/metadata and then click Add.

6. Turn off AD FS assertion encryption for the relying party (Tableau Server does not currently support assertion encryption).

On the AD FS server, use Windows PowerShell to run the following command (change the display name for to <MySiteName>):

Set-ADFSRelyingPartyTrust -TargetName <MySiteName> -EncryptClaims 0

**Note:** If you receive the error, Set-ADFSRelyingPartyTrust Cmdlet cannot be found, you must add the AD FS PowerShell snap-in. At the command prompt type: Add-PSSnapin Microsoft.Adfs.PowerShell, and then repeat step 6.

Step 4: Import the AD FS metadata into a site

1. Sign in to Tableau Server as a site administrator.

2. If you have more than one site for Tableau Server, select the site for which you want
to enable SAML in the sites drop-down.

3. Click **Settings**.

4. Click the **Authentication** tab.

   ![Tableau Server Settings](image)

   **Note:** If you do not see the **Authentication** tab, ensure that Tableau Server contains more than one site.

5. On the **Authentication** tab, under **4 Import metadata file to Tableau Server**, in the IdP metadata file box, specify the name of the file you exported from AD FS (FederationMetadata.xml).

6. Skip **5. Match attributes**. You’ve already created a claim rule in AD FS to match the attribute names to what Tableau Server expects.

7. Under **6. Manage users**, if you don’t have users in Tableau Server besides your administrator account, click **Add users**. You can then add users manually using the form or import a CSV file.

   **Note:** If you have already added users to your site, click **Select users**. For each user, select the check box next to the user’s name, and then on the **Actions** menu select **Authentication**. Change the authentication method to SAML SSO.

8. (Optional) To test SAML sign in, open a private window or private browsing session in
your browser. For example, in Google Chrome, in the upper right corner of the window click **Customize and control Google Chrome > New incognito window**, and then navigate to your site.

a. Enter the email address of the user. Tableau Server will remove the password field if the user’s account is correctly set up for SAML SSO authentication.

b. Click **Sign in**. On your AD FS sign in page, enter your AD credentials. After you're authenticated AD FS will redirect you to Tableau Server.

c. Your Tableau Server site is now ready to authenticate using AD FS and SAML. Your users will still navigate to your site to sign in. But now, after entering their email address, the page will automatically redirect through AD FS and ask users for their AD username and password.

Other AD FS considerations

- After setting up SAML integration between AD FS and Tableau Server, you must add and delete users in Tableau Server to keep changes in sync with any changes you make in Active Directory, such as user name changes, adding or removing users, etc. You can add users automatically or manually:

  - To add users automatically: Create a script (using PowerShell, Python, or batch file) to sync users between AD and Tableau Server. The script can use either **tabcmd** or **REST API** to interact with Tableau Server.

  - To add users manually: Upload a **CSV file** or enter email addresses (semi-colon-delimited) in the Tableau Server UI. To remove users, set their site role to unlicensed to keep any content owned by them. Deleting a user also deletes any content they own.

- A user’s email address is their unique identifier in Tableau Server. When using either automated or manual methods to sync users between Tableau Server and AD FS, your users’ email addresses must match the email address stored in AD.

- You added a claim rule in AD FS to match the attributes (first name, last name, and
email address) between AD FS and Tableau Server (Step 3: Configure AD FS to accept sign in requests from Tableau Server). Alternatively, you could match these attributes in Tableau Server instead using Settings > Authentication > SAML > Edit Connection > 5. Match attributes in your Tableau Server site.

- If you run into errors while testing SAML sign in, you can debug these errors using the SAML log files generated by Tableau Server. To download the log file from your Tableau Server site, click Settings > Authentication > SAML > Edit Connection, and then under 7. Troubleshooting single sign-on (SSO), click Download log file.

Troubleshoot SAML

This topic provides information about resolving issues that can occur when you configure SAML authentication.

SAML and Enable Automatic Logon

If you are using SAML and if Tableau Server is also configured to use Active Directory, do not also select Enable automatic logon. Enable automatic logon and SAML cannot both be used on the same server installation.

HTTP Status 500 error when configuring SAML

Under some circumstances you might get an HTTP status 500 error and see the following error after enabling SAML and navigating to the Tableau Server URL in a browser:

```
org.opensaml.saml2.metadata.provider.MetadataProviderException:
User specified binding is not supported
by the Identity Provider using profile urn:oasis-is:names:tc:SAML:2.0:profiles:SSO:browser
```

To help resolve this error, make sure of the following:

- The IdP URL for the SSO profile specified in the SAML tab is correct.
- The IdP URL for the SSO profile provided while creating the service provider in the
IdP is correct.

- The IdP is configured to use HTTP-POST requests. (Redirect and SOAP are not supported.)

If any of these settings were not correct, make appropriate updates and then perform the SAML configuration steps again, starting with generating and exporting the XML metadata document from Tableau Server.

If these settings are correct, but you still see the error, examine the metadata XML that is produced by Tableau Server and by the IdP, as described in SAML Requirements.

Signing In from the Command Line

SAML is not used for authentication when you sign in to Tableau Server using tabcmd or the Tableau Data Extract command line utility (provided with Tableau Desktop), even if Tableau Server is configured to use SAML. These tools require the authentication configured when Tableau Server was originally installed (either local authentication or AD).

Login Failed

Login can fail with the following message:

Login failure: Identity Provider authentication successful for user <username from IdP>. Failed to find the user in Tableau Server.

This error typically means that there is a mismatch between the usernames stored in Tableau Server and provided by the IdP. To fix this, make sure that they match. For example, if Jane Smith's username is stored in the IdP as jsmith it must be stored in Tableau Server as jsmith.

SAML Error Log

SAML authentication takes place outside Tableau Server, so troubleshooting authentication issues can be difficult. However, login attempts are logged by Tableau Server. You can cre-
ate a snapshot of log files and use them to troubleshoot problems. For more information, see Archive Log Files.

**Note:** To log SAML-related events, `vizportal.log.level` must be set to `debug`. For more information, see Change Logging Levels.

Check for SAML errors in the following files in the unzipped log file snapshot:

```
\vizportal\vizportal-<n>.log
```

In Tableau Server 9.0 and later, the application process (vizportal.exe) handles authentication, so SAML responses are logged by that process.

**Trailing Slash**

On the SAML tab, confirm that the **Tableau Server return URL** does not end with a trailing slash (correct: http://tableau_server; incorrect: http://tableau_server/):
Confirm Connectivity

Confirm that the Tableau Server you are configuring has either a routeable IP address or a NAT at the firewall that allows two-way traffic directly to the server.

You can test your connectivity by running telnet on Tableau Server and attempting to connect with the SAML IdP. For example: `C:\telnet 12.360.325.10 80`

The above test should connect you to the HTTP port (80) on the IdP and you should receive an HTTP header.

Kerberos

Kerberos is a three-way authentication protocol that relies on the use of a trusted third-party network service called the Key Distribution Center (KDC) to verify the identity of computers and provide for secure connections between the computers through the exchange of tickets. These tickets provide mutual authentication between computers or services, verifying that one has permission to access the other.

Tableau Server supports Kerberos authentication in an Active Directory Kerberos environment, with authentication to Tableau Server being handled by Kerberos.

**Note:** The Kerberos support in Tableau Server is for user authentication. It does not handle internal permissions and authorization related to Tableau Server content, such as workbooks.

Quick Start: Single Sign-On with Kerberos

Tableau Server now supports Kerberos-based single sign-on (SSO). Users with Active Directory (AD) accounts in a Kerberos-enabled environment can now use SSO to connect to Tableau Server from Tableau Desktop and web browsers. In addition, Tableau Server can use Kerberos for authentication to Kerberos-enabled Microsoft SQL, MSAS, PostgreSQL, Hive/Impala, and Terradata data sources. When Tableau Server is configured for Kerberos,
you can make SSO connections to Cloudera Impala databases using server managed credentials for Impala LDAP authentication.

1 Configure Tableau Server

After you install Tableau Server, run the Tableau Server Configuration utility. On the **Kerberos** tab select **Enable Kerberos for single sign-on**.

![Tableau Server Configuration](image)

2 Generate the Configuration Script

Click **Export Kerberos Configuration Script** to generate a batch file that will configure Kerberos in AD for Tableau Server.

![Kerberos Configuration](image)
Save the file and then send it to your AD domain administrator to run.

3 Run the Configuration Script

The domain administrator needs to run the script from a command prompt on any computer in the domain by typing the name of the script.

When your domain administrator runs the configuration script, the script registers Service Principal Names (SPNs) for Tableau Server using the Run As User account, and generates a .keytab file for your environment. (The .keytab file is created in a \keytabs folder in the folder where the script was run.

Have the domain administrator send you a copy of the .keytab file.

4 Copy the .keytab File

On the Kerberos tab of the Tableau Server Configuration utility, enter the path to the .keytab file in the text box in Step 3.

The utility will copy the file to each gateway node in the Tableau Server installation.

Click Test Configuration to verify that the configuration is correctly set up. If the SPNs are correctly set up, the test should display an OK. The number of services configured for delegation will be 0 (zero) unless you have completed the steps below in Configure Kerberos Delegation in AD.

Configure Kerberos Delegation in AD

To use Kerberos Authentication with SQL Server or MSAS data source, or to make SSO connections to Cloudera Impala, you need to configure Kerberos delegation in AD. You don’t need to complete these steps if you will only be using Kerberos SSO to connect to Tableau Server.
To configure Kerberos delegation in AD:

- Enable the Run As User to act as the operating system. For more information, see Enable Run As User to Act as the Operating System.

- Enable Kerberos delegation in AD. This step is specific to the supported connection type(s) that you will be using with Tableau:
  
  - **SQL Server** - See Enabling Kerberos Delegation for SQL Server in the Tableau Community.
  
  - **MSAS** - See Enabling Kerberos Delegation for MSAS in the Tableau Community.
  
  - **Hive/Impala** - See Enable Kerberos Delegation for Hive/Impala.
  
  - **Impala** - See Enabling Delegation for Cloudera Impala in the Tableau Community.
  
  - **PostgreSQL** - See Enabling Delegation for PostgreSQL in the Tableau Community.
  
  - **Teradata** - See Enabling Delegation for Teradata in the Tableau Community.

Kerberos Authentication in Tableau Server

When you configure Tableau Server for Kerberos in an Active Directory (AD) environment, the AD domain controller also serves as the Kerberos Key Distribution Center (KDC) and issues Ticket Granting Tickets to the other nodes in the domain. Users authenticated by the KDC do not have to authenticate further when connecting to Tableau Server.

The following is a diagram of the authentication workflow.
User logs into their Active Directory domain.

The Kerberos KDC authenticates the user and sends a Ticket Granting Ticket (TGT) to the user's computer.

The user connects to Tableau Server in Tableau Desktop or in a web browser.

Tableau Server authenticates the user.

Kerberos Requirements

To use Kerberos authentication with Tableau Server, you need the following:

- **Windows Server**: Tableau Server must be installed on a server version of Windows. Non-server versions (including Windows 7 and Windows 8) do not support the `ktpass` command required for generating a keytab file.

- **Active Directory**: 

- **Kerberos Requirements**

- **Windows Server**: Tableau Server must be installed on a server version of Windows. Non-server versions (including Windows 7 and Windows 8) do not support the `ktpass` command required for generating a keytab file.

- **Active Directory**: 

- Tableau Server must use Active Directory (AD) for authentication.
- The domain must be an AD 2003 or later domain for Kerberos connections to Tableau Server.
- The domain must be an AD 2012 or later domain for delegated Kerberos connections to data sources. (2012 R2 is preferred because it has a dialog for configuring constrained delegation. 2012 non-R2 requires manual configuration.)

- **Run As User account:**
  - The Run As User account (the Tableau Server service account) must be an AD domain account. Local accounts, including NTAUTHORITY\NetworkService will not work.
  - The Run As User account must be in the same domain as the database services that will be delegated.
  - Constrained delegation: The Run As User account must be granted access to the target database Service Principal Names (SPNs).
  - Data Source authentication: If you plan to use Kerberos to authenticate to Microsoft SQL Server, MSAS, PostgreSQL or Teradata databases, enable the Run AS User account to act as part of the operating system. For more information, see Enable Run As User to Act as the Operating System.

- **Single-Sign On (SSO):**
  - Kerberos constrained delegation for SSO to Tableau Server is not supported.

For SSO to Tableau Server, users must be granted a Kerberos Ticket Granting Ticket (TGT) from Active Directory when they sign into their computers. This is standard behavior for domain-joined Windows computers and standard for Mac computers that use AD as their network account server. For more information on using Mac computers and Active Directory, see Join your Mac to a network account server in the Apple Knowledge Base.
• **External Load Balancer/Proxy Server:** If you are going to use Tableau Server with Kerberos in an environment that has external load balancers (ELBs) or proxy server, you need to set these up before you configure Kerberos in the Tableau Server Configuration utility. See Add a Load Balancer and Configure a reverse proxy server for more information.

• **Smart Card Support:** Smart cards are supported when users sign into their workstations with a smart card and this results in a Kerberos TGT being granted to the user from Active Directory.

• **Tableau Mobile app and iOS Browser Support:** An iOS user can use Kerberos authentication with the Tableau Mobile app and mobile Safari if a Configuration Profile specifying the user's Kerberos identity is installed. See Configuring an iOS Device for Kerberos Support in the Tableau Mobile Help.

For more information about browser support for Kerberos SSO, see Browser Support for Kerberos SSO.

External load balancers:

- If you are using an external load balancer or a reverse proxy, complete the configuration for the external load balancer or reverse proxy before configuring Tableau Server for Kerberos.

**Note:** If you configure these after configuring Tableau Server for Kerberos, the configuration script generated by the Tableau Server Configuration utility might use the wrong host names. See Add a Load Balancer and Configure a reverse proxy server for more information.

To use Kerberos authentication for delegated access with data sources:
• **Data Sources:**
  - The supported data sources (SQL Server, MSAS, PostgreSQL, Hive/Impala, and Teradata) must be configured for Kerberos authentication.
  - The data sources must be on the same domain as Tableau Server (users can be on different domains).

Kerberos connections to Tableau Server are supported in the following configurations:

  - Tableau Server requires constrained delegation, where the Run As User account is specifically granted rights to the target database SPNs. Unconstrained delegation is not supported.

Configure Kerberos

You can configure Tableau Server to use Kerberos. This allows you to provide a single sign-on (SSO) experience across all the applications in your organization. Before you configure Tableau Server for Kerberos make sure you meet the Kerberos Requirements.

**Note:** Kerberos constrained delegation for SSO to Tableau Server is not supported. (Constrained delegation for data sources is supported.) For more information, see Single-Sign On (SSO) in Kerberos Requirements.

1. Open a command prompt as an administrator and change directories to the location of Tableau Server's bin directory. The default location is `C:\Program Files\Tableau\Tableau Server\10.2\bin`.

2. Type the following command to stop Tableau Server:

   ```
   tabadmin stop
   ```

3. Open the Tableau Server Configuration Utility (**Start** > **All Programs** > **Tableau Server 10.2** > **Configure Tableau Server**), and then click the Kerberos tab.

4. Select **Enable Kerberos for single sign-on**.
5. Click **Export Kerberos Configuration Script**. The generated script configures your Active Directory domain to use Kerberos with Tableau Server. For more information, see Kerberos Configuration Script.

![Export Kerberos Configuration Script]

**Note**: Verify the host names in the setspn lines of the script. If you are using an external load balancer or a reverse proxy, the host names should match the name you used when you configured Tableau Server for the load balancer or proxy. If you have not configured Tableau Server for your proxy or external load balancer, do that and then re-export the Kerberos configuration script to ensure it has the correct host names. See Add a Load Balancer and Configuring Proxies for Tableau Server.

6. Have your Active Directory domain administrator run the configuration script to create Service Principal Names (SPNs) and the .keytab file. The domain administrator should do the following:

- Review the script to verify it contains correct values.
- Run the script at a command prompt on any computer in the domain by typing the script name (not by double-clicking the script in Windows Explorer).

The script creates a file, `kerberos.keytab`, in a `\keytabs` folder in the location that the script was run.

7. Save a copy of the .keytab file created by the script to the Tableau Server computer.

In Step 3, enter the path to the .keytab file, or click the browse button to navigate to the
The keytab file will be copied to all the gateway nodes in your Tableau Server installation when you click OK in the Configuration utility.

**Note:** Do not rename the .keytab file. The script creates a file named `kerberos.keytab` and you need to save it with this name.

8. (optional) Click **Test Configuration** to confirm that your environment is configured correctly to use Kerberos with Tableau Server.

![Test Configuration result](image)

Tests For:
- *SPNs are correctly configured*: OK
- *Number of services configured for delegation*: 0

If you have not configured any data sources for Kerberos delegation, 0 is shown for the **Number of services configured for delegation**.

9. Click **OK** to save your Kerberos configuration.

10. Start Tableau Server.

Confirm Your SSO Configuration

Once Tableau Server has restarted, test your Kerberos configuration from a web browser on a different computer by typing the Tableau Server name in the URL window:
You should be automatically authenticated to Tableau Server.

Kerberos Configuration Script

When you click **Export Kerberos Configuration Script** in the Tableau Server Configuration utility, the `KerberosConfig.bat` script is generated. This script registers the Service Principal Names (SPNs) for Tableau Server in Active Directory (AD) and generates a Kerberos `.keytab` file.

**SPNs** - The script uses the `setspn` utility to register the SPNs for Tableau Server, using the Run As User account. These SPNs are used for generating the `.keytab` file, and for authenticating web browser connections to Tableau Server.

**.keytab** - The script uses the `ktpass` utility, to generate a `kerberos.keytab` file, located in the \keytabs folder in the folder where the script was run. The `.keytab` file contains the shared secret key for Tableau Server.

**Note:** The `setspn` and `ktpass` utilities may generate warning or errors. You can ignore these errors and warnings if the utilities run to completion.

Enable Kerberos Delegation

Kerberos delegation enables Tableau Server to use the Kerberos credentials of the viewer of a workbook or view to execute a query on behalf of the viewer. This is useful in the following situations:

- You need to know who is accessing the data (the viewer’s name will appear in the access logs for the data source).
- Your data source has row-level security, where different users have access to different rows.
Tableau Server requires constrained delegation, with the Run As User account specifically granted delegation rights to the target database Service Principal Names (SPNs). Delegation is not enabled in Active Directory by default.

**Note:** Kerberos constrained delegation for SSO to Tableau Server is not supported. Constrained delegation for data sources is supported. The client computer must have a TGT from the Active Directory domain. For more information, see Single-Sign On (SSO) in Kerberos Requirements.

To configure Kerberos delegation:

1. On all nodes in Tableau Server, configure the Run As User to act as part of the operating system. For more information, see Enable Run As User to Act as the Operating System.

2. In Active Directory:
   - Configure SPNs for the data sources you will be using.
   - Enable Kerberos delegation for the data sources' SPNs
   - (Optional for multi-domain environments) Configure krb5_conf.html to map principal names to local user names for each Kerberos realm. See Kerberos delegation multi-domain configuration.

3. Enable delegation for data connections:
   - **SQL Server**—See Enabling Kerberos Delegation for SQL Server in the Tableau Community.
   - **MSAS**—See Enabling Kerberos Delegation for MSAS in the Tableau Community.
   - **Hive/Impala**—See Enable Kerberos Delegation for Hive/Impala.
Enable Kerberos Delegation for Hive/Impala

Disclaimer: This topic includes information about a third-party product. Please note that while we make every effort to keep references to third-party content accurate, the information we provide here might change without notice as Hive/Impala changes. For the most up-to-date information, please consult Hive/Impala documentation and support.

Starting with Tableau Server 10, Tableau Server supports Kerberos delegation to Hive/Impala data sources.

You can use two different authentication approaches with Kerberos between Tableau Server and Hive/Impala:

- Constrained Delegation/Viewer Credentials
- Database Impersonation using Delegation UID

Before you can use constrained delegation, you need to configure Tableau Server for Kerberos. For more information see Configure Kerberos. Verify that the Hive/Impala driver that is installed on Tableau Server supports constrained delegation on Windows. With Tableau Server configured, you can use Kerberos for single sign-on (SSO) between Tableau Desktop or a web browser and Tableau Server.

Before you can use database impersonation using the Tableau Server Run As User, the Run As User must be a network account and configured to log in to Hive/Impala using Kerberos. You must also verify that the Hive/Impala driver that is installed on Tableau Server supports the delegationUID parameter.

The next step depends on which Kerberos authentication type you want to use:
• Constrained Delegation—To use constrained delegation, you need to enable Kerberos delegation in Active Directory (AD). See Enabling Constrained Delegation below.

• Database Impersonation—To use database impersonation, you need to configure delegation on your Hadoop distribution. This configuration is beyond the scope of Tableau Server documentation, but for more information, see Database Impersonation below.

Enabling Constrained Delegation

Enabling constrained delegation for Kerberos to Hive/Impala requires you to specify the Tableau Server Run As User for delegation, and add the Hive/Impala services account for delegation in Active Directory. You need to be a domain administrator for your AD domain to do these steps. After configuring Tableau Server for Kerberos, do the following:

Specify the Run As User for delegation

1. On the Active Directory domain controller, start the Active Directory Users and Computers (ADUC) tool.

2. In the left pane (Active Directory Domain Services), click Users.

3. In the Users pane, right-click the name of the Run As User who will be doing the delegation and then click Properties.

4. In the Properties dialog box, in the left pane, select Delegation.

5. In the Delegation section, select Trust this user for delegation to specified services only.

6. Select Use any authentication protocol.
Add Hive/Impala service accounts for delegation

1. To specify the services to be delegated, click **Add**.

2. In the Add Services dialog box, click **Add Users or Computers**.

3. In the text field, type the name of the Hive/Impala service account and then click **Check Names**. The account should be found.

4. Click **OK**.

   The SPN (Service Principal Name) list is populated.

5. Select the SPNs registered for the Hive/Impala services you want to delegate to.

   The SPNs should now appear in the SPN list in the delegation section of the properties window for the user.

6. Click **OK**.

When this configuration is complete and Tableau Server users publish workbooks or data sources to the server specifying Viewer Credentials, delegation is done to make the connection to the Hive/Impala data source.

Database Impersonation

Database impersonation for Kerberos to Hive/Impala requires you to configure your Hadoop distribution for delegation using the DelegationUID connection parameter.

Publish using Database Impersonation

You can publish using database impersonation with one of two methods:

- Embedded credentials—If you do not have a Kerberized cluster, or you have an LDAP frontend, you can embed the credentials for the impersonating user when publishing. The user you connect as when you publish must be configured with the ability
to delegate for other users.

- Impersonate with server run as—If you have a Kerberized cluster, you can connect with this option. In this case we will connect as the Tableau Server service user using Kerberos to the backend. The impersonating user, in this case Tableau Server, must be configured with the ability to delegate for other users.

You can validate that database impersonation is configured using the driver manager:
Enable Kerberos for Oracle

Starting with Tableau Server version 10.0, Tableau Server supports Kerberos authentication for Oracle data sources.

To use this feature, you must install and configure software on both Tableau Desktop and Tableau Server.
Disclaimer: This topic includes information about a third-party product. Please note that while we make every effort to keep references to third-party content accurate, the information we provide here might change without notice as Oracle changes. For the most up-to-date information, please consult Oracle documentation and support.

This topic contains the following sections:

- Configure Tableau Desktop
- Configure Tableau Server
- Use Kerberos authentication

Configure Tableau Desktop

This section describes how to configure Tableau Desktop for Windows computer to use Kerberos on a Oracle connector.

Prerequisites

Before you can configure Kerberos for Oracle on Tableau Desktop, you must perform the following tasks on each installation of Tableau Desktop:

- Install the Java SE Development Kit on the Tableau Desktop computer.
- Install either the 11g or 12c version of the Oracle Data Access (ODAC) driver.
- Install the Tableau Oracle driver. You can download the driver from the Tableau Drivers & Activation web page.

Step 1: Set system environmental variables

Follow the procedure in the Tableau Knowledge Base to set the required environment variables.
Note: All file path examples in this document use C: drive as system drive. If you have installed to a different drive, change paths accordingly. In all cases, verify the paths. Oracle client paths will include the latest version (for example, 11.2.0), which might not match the file versions exactly as shown here.

For the Oracle 11g client:

- Set the **ORACLE_HOME** variable to `C:\app\user_name\product\11.2.0\client_1`

- Set the **TNS_ADMIN** variable to `C:\app\user_name\product\11.2.0\client_1\Network\Admin`

For the Oracle 12c client:

- Set the **ORACLE_HOME** variable to `C:\app\client\user_name\product\12.1.0\client_1`

- Set the **TNS_ADMIN** variable to `C:\app\user_name\product\12.1.0\client_1\Network\Admin`

Step 2: Customize the sqlnet.ora file

1. In a text editor, open the `%ORACLE_HOME%\Network\Admin\sqlnet.ora` file.

2. Copy the following content into the file:

   - For the Oracle 11g client

     ```
     SQLNET.KERBEROS5_REALMS= C:\Windows\krb5.realms
     SQLNET.AUTHENTICATION_SERVICES = (BEQ, TCPS, KERBEROS5)
     SQLNET.KERBEROS5_CONF = C:\Windows\krb5.ini
     ```
SQLNET.KERBEROS5_CONF_MIT = TRUE
SQLNET.KERBEROS5_CC_NAME = OSMSFT:

- For the Oracle 12c client

SQLNET.KERBEROS5_REALMS = C:\Windows\krb5.realms
SQLNET.AUTHENTICATION_SERVICES = (BEQ, TCPS, KERBEROS5PRE, KERBEROS5)
SQLNET.KERBEROS5_CONF = C:\Windows\krb5.ini
SQLNET.KERBEROS5_CONF_MIT = TRUE
SQLNET.KERBEROS5_CC_NAME = OSMSFT:

3. Save and close the file. You will need this file later when you configure Tableau Server.

Step 3: (Optional) Create and customize the tnsnames.ora file

If your users will be using the Generic ODBC Connection, create the tnsnames.ora file.

1. Open a text editor and copy the following content into the editor:

```plaintext
ORCL =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = FQDN_of_Oracle_DB)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl)
    )
  )
```

where \textit{FQDN\_of\_Oracle\_DB} is the host name of the Oracle server your users will connect with, such as oracle1.dev.example.lan. You can add multiple host names to this parameter.

2. Save the file and name it \texttt{tnsnames.ora}.

3. Copy the file to the \texttt{%ORACLE\_HOME\%Network\Admin\} folder.

**Step 4: Create and customize the krb5.ini file**

1. Open a text editor and copy the following content into the editor:

   
   [libdefaults]  
   forwardable = true  
   default_realm = \textit{FQDN\_user\_domain}  
   default_tkt_enctypes = rc4-hmac  
   default_tgs_enctypes = rc4-hmac  

   [realms]  
   \textit{FQDN\_user\_domain} = {  
   kdc = \textit{FQDN\_domain\_controller}  
   admin_server = \textit{FQDN\_domain\_controller}  
   }  

   [domain_realm]  
   \textit{FQDN\_user\_domain} = \textit{FQDN\_user\_domain}  
   \textit{FQDN\_user\_domain} = \textit{FQDN\_user\_domain}  

where:

- \textit{FQDN\_user\_domain} is the fully qualified domain name of the domain where users are authenticated, such as users.dev.example.lan

- \textit{FQDN\_domain\_controller} is the fully qualified domain name of a domain controller in the domain where users are authenticated, such as dc1.users.dev.example.lan

2. Save file and name it \texttt{krb5.ini}. 

- 927 -
3. Copy the file to the C:\Windows\ folder. When you configure Tableau Server, you will also copy this file to the computer running Tableau Server.

Configure Tableau Server

This section describes how to configure Tableau Server. You must follow these steps on each computer that is running Tableau Server.

Prerequisites

Before you can configure Kerberos for Oracle on Tableau Server, you must perform the following tasks:

- Configure Kerberos.
- Enable Run As User to Act as the Operating System.
- Install Java SE Development Kit on the Tableau Server computer.

Step 1: Install Oracle Database Client on the Tableau Server computer

1. Download the Oracle Database Client 12c Release 1 (winx64_12102_client.zip) from the Oracle website.

2. Extract the downloaded file and run Setup.exe.

3. Select the following options:
   - On the Select Installation Type page, select Administrator.

Step 2: Set system environmental variables

Follow the procedure in the Tableau Knowledge Base to set the following variables:
• **Set the** ORACLE_HOME **variable to** C:\app\user_name\product\12.1.0\client_1

• **Set the** TNS_ADMIN variable to C:\app\user_name\product\12.1.0\client_1\Network\Admin

**Step 3: Install Oracle Database Patch on the Tableau Server computer**

Download the Oracle Database Patch version 12.1.0.2.10 from the Oracle website. Follow the installation instructions in the Readme.html file that is included with the patch.

**Step 4: Copy client files to Tableau Server**

Find the following files that you created when configuring Tableau Desktop and copy them to Tableau Server:

• **Copy** sqlnet.ora **to the following path:**

  C:\app\client\user_name\product\12.1.0\client_1\network\admin\sqlnet.ora

• **Copy** krb5.ini **to the following path:**

  C:\Windows\krb5.ini
Use Kerberos authentication

1. On a Tableau Desktop computer, open the Oracle connector.

2. In the **Server** field, enter the fully qualified host name of the Oracle server, such as `oracle1.dev.example.lan`.

3. Select **Integrated Authentication**.

4. Create a workbook with a view and publish it to Tableau Server. When you publish the workbook, configure authentication to use viewer credentials as described in Tableau Desktop help.

Enable Single Sign-On for SAP BW

Starting with Tableau 10.2, you can configure single sign-on (SSO) support from Tableau to SAP NetWeaver Business Warehouse (SAP BW). To use this feature, you must install and
configure software on the computers that run Tableau Server and Tableau Desktop.
Detailed instructions can be found on Tableau Community:

- To configure impersonation from Tableau Server to SAP BW using server side trust, see Configuring Delegation from Tableau Server to SAP BW on Tableau Community. Note that Tableau Server doesn't use Kerberos to connect to SAP BW, so you don't configure Kerberos on Tableau Server.

- To configure Kerberos authentication from Tableau Desktop to SAP BW, see Configuring Single Sign-On for Tableau Desktop to SAP BW on Tableau Community.

Enable Run As User to Act as the Operating System

To use Kerberos delegation with Tableau Server, you must configure the Run As User account to act as the operating system on each Tableau Server node.

1. On the computer that is running Tableau Server, select Start > Control Panel > Administrative Tools > Local Security Policy.

2. In the Local Security Settings window, expand Local Policies, click User Rights Assignments, and then right-click Act as part of the operating system and select Properties.
3. In the Act as part of the operating system Properties window, click **Add User or Group**.

4. Type the `<domain>\<username>` for the Tableau Server Run As User account (for example: `MYCOMPANY\tableau_server`), and then click **Check Names**.

5. When the account resolves correctly, it is underlined. Click **OK**.

6. Click **OK** to close the Local Security Policy windows.

**Browser Support for Kerberos SSO**

To use browser-based Kerberos Single Sign-on (SSO), the following must be true:
- Kerberos must be enabled on Tableau Server
- The user must have permission to access Tableau Server (they can log in using a user name and password)
- The user must be authenticated to Active Directory through Kerberos on the client computer. Specifically, this means that they have a Kerberos Ticket Granting Ticket (TGT).

**Note:** If Kerberos SSO fails you can still sign in to Tableau Server with your user name and password.

### Desktop clients

The following combinations of operating system and Tableau Desktop or browser support Kerberos authentication to Tableau Server. In some cases, additional configuration is required.

**Windows**

- Tableau Desktop 8.3 or newer
- Internet Explorer - supported, may require configuration, see Note 1
- Chrome - supported, may require configuration, see Note 1
- Firefox - requires configuration, see Note 2
- Safari - not supported

**Mac OS X**

- Tableau Desktop 8.3 or newer
- Safari - supported
- Chrome - see Note 3
- Firefox - see Note 2
- Internet Explorer - not supported

### Mobile clients

The following combinations of operating system and Tableau App or browser support Kerberos authentication to Tableau Server:

**Mac iOS**
- Tableau App 8.3 or newer - see Note 4
- Safari - see Note 4
- Chrome - not supported

Android - see Note 5
- Tableau App 8.3 or newer
- Android Browser
- Chrome

**Note 1: Internet Explorer and Google Chrome on Windows desktop**

Kerberos SSO is supported on both Internet Explorer and Google Chrome but requires configuration in Windows Internet Options:

- Enable Integrated Windows Authentication.
- Verify that Tableau Server URL is in the local intranet zone. The Tableau Server URL must be in the local internet zone. In many cases Internet Explorer’s automatic detection of intranet zones will automatically configure this. If the URL has not been detected and configured, then you will need to manually add the URL to the local intranet zone.

To enable Integrated Windows Authentication:

1. In Windows Control Panel, open **Internet Options**.
2. On the Advanced tab scroll down to the Security section.
4. Click **Apply**.

To verify or add the Tableau Server URL to the local intranet zone:

1. In Windows Control Panel, open **Internet Options**.
2. On the Security tab, select Local intranet, and then click Sites.
3. On the Local intranet dialog box, click Advanced.
4. The internal Tableau Server URL should be listed in the **Websites** field. In some organizations, IT administrators will use a wildcard (*) to specify internal URLs. For example, the wildcard, https://*.example.lan, includes all servers in the
internal example.lan namespace in the local intranet zone.

- If the Tableau Server URL or a wildcard URL for the Tableau Server namespace is listed in the Websites field, then click Close. You do not need to update the local intranet zone.
- If the Tableau Server URL or a wildcard URL is not specified in the Websites field, Enter the Tableau Server name (URL) in the Add the website to the zone field, click Add, and then click OK.

Note 2: Firefox on Windows and Mac OS X desktop

Kerberos SSO is supported in Firefox on both Windows and Mac, but requires that you configure two URL settings to enable Kerberos. Both of those settings are described in the following procedure:

1. In Firefox, enter about:config in the address bar.

2. Click I'll be careful, I promise when warned about changing advanced settings.

3. Enter negotiate in the Search box.
4. Double-click `network.negotiate-auth.allow-non-fqdn`, and then set the value to `true`.

5. Double-click `network.negotiate-auth.trusted-uris` and enter the Tableau Server fully qualified domain name (FQDN). For example, `tableau.example.com` or `example.com`.

**Note 3: Chrome on Mac OS X desktop**

According to Chrome documentation, Kerberos SSO works on a Mac when you launch Chrome from a terminal window with the following command:

```
open -a "Google Chrome.app" --args --auth-server-whitelist="tableau-server.example.com"
```

where `tableau-server.example.com` is the URL for Tableau Server in your environment.

However, we have found inconsistent results in our testing and therefore recommend using Safari or Firefox if you want to use Kerberos SSO on a Mac. See the *Integrated Authentication* section at [HTTP authentication](#) on The Chromium Projects site for more information.
Note: Chrome on Mac OS X continues to be supported with Tableau Server, but users may be prompted to log in with their user name and password (single sign-on may not work).

Note 4: Mobile Safari and Tableau App on Mac iOS

Kerberos SSO is supported if iOS is configured for Kerberos. The iOS device must have a Kerberos authentication configuration profile installed. This is usually done by an enterprise IT group. Tableau Support cannot assist with configuring iOS devices for Kerberos.

Note 5: Android platform

Kerberos SSO is not supported on the Android operating system because there is no platform-level support for Kerberos. You can still use your Android device and the Tableau App or a supported browser to connect to and log in to Tableau Server.

Troubleshoot Kerberos

The troubleshooting suggestions in this topic are divided into issues related to Single sign-on (SSO) on the server and issues with the delegated data sources.

Single Sign-on to Tableau Server

Kerberos Authentication Failed (unable to connect automatically to Tableau Server)

If you are using Kerberos for SSO and a user is prompted to sign in to Tableau Server when they connect with either a web browser or with Tableau Desktop, try these steps from the client computer:
Troubleshooting on the client computer

- **Account permissions**—Try to sign in to Tableau Server using the user’s name and password. If they can’t sign in to Tableau Server using their user name and password, they do not have permission to access Tableau Server and Kerberos authentication will fail.

- **Other accounts**—Try to connect with SSO to Tableau Server using other user accounts. If all users are affected, the problem may be in the Kerberos configuration.

- **Computer location**—Kerberos will not work when connecting from localhost. Clients must be connecting from a computer other than the Tableau Server computer.
• **URL address**—You cannot use Kerberos SSO when connecting using an IP address. In addition, the server name you use to access Tableau Server must match the name used in the Kerberos configuration (see Key table entry, below).

• **TGT (Ticket Granting Ticket)**—Confirm that the client computer has a TGT from the Active Directory domain. Kerberos requires a TGT to sign in. Constrained delegation, with the proxy granting a ticket, is not supported. For more information, see Single-Sign On (SSO) in Kerberos Requirements.

To confirm the client computer has a TGT, type:

- `klist tgt` at a command prompt on a Windows computer
  or
- `klist` at a terminal prompt on a Mac computer

The output should show a TGT for the user/domain trying to authenticate to Tableau Server.

The client computer may not have a TGT in the following circumstances:

- The client computer is using a VPN connection
- The client computer is not joined to the domain (for example, it is a non-work computer being used at work)
- The user signed into the computer with a local (non-domain) account
- The computer is a Mac that is not using Active Directory as a network account server

• **Browser**—Check which browser the user is using to access the server

  - Internet Explorer (IE) and Chrome work "out of the box" on Windows
  - Safari works "out of the box" on Mac
- Firefox requires additional configuration

For more information about browser support for Kerberos Single Sign-On (SSO), see Browser Support for Kerberos SSO.

Troubleshooting on the server

If you cannot solve the problem from the client computer, your next steps are to troubleshoot on the computer running Tableau Server. The administrator can use the request ID to locate the sign-in attempt in the Apache logs on Tableau Server.

- **Log files**—Check the Apache error.log for an error with the exact time/date of the failed sign-in attempt.
  - In a ziplog archive, these logs are in the \httpd folder.
  - On Tableau Server, these logs are in the \data\tabsvc\logs\httpd\ folder.

- **Key table entry**—If the error.log entry says "No key table entry matching HTTP/<servername>.<domain>.<org>@", for example:

  [Fri Oct 24 10:58:46.087683 2014] [::error] [pid 2104:tid 4776] [client 10.10.1.62:56789] gss_acquire_cred() failed: Unspecified GSS failure. Minor code may provide more information (, No key table entry found matching HTTP/servername.domain.com@)

This error is a result of a mismatch between any of the following:

- **Tableau Server URL** - The URL used by the client computer to access the server.

  This is the name that you type into Tableau Desktop or a browser address bar. It could be a shortname (http://servername) or a fully-qualified domain name (http://servername.domain.com)
• **DNS reverse lookup** for the server IP address

  This looks up a DNS name using an IP address.

  At a command prompt type:

  ```
  ping servername
  ```

  with the IP address returned by pinging the server, do a reverse DNS lookup type:

  ```
  nslookup <ip address>
  ```

  The Tableau Server computer name needs to match in:

  • .keytab file

  • Service Principal Name (SPN) for the server

  **Test Configuration and tabconfig.log**

  Use the Test Configuration button in the Tableau Server Configuration utility:
If your SPNs are correctly set up for Kerberos, **SPNs are correctly configured** shows OK.

If any services are configured for delegation, the number of configured services will appear. A value of 0 (zero) does not indicate a problem unless you are using delegation and Kerberos authentication to SQL Server or MSAS.

Look in `tabconfig.log` for any problems or errors. For example:

```
2014-10-17 10:58:16.545 -0700 ERROR root: No SPN entries found
```

If the test does not show successful results, run the configuration script again.

Data source SSO

**Delegated data source access failures**

Check the `vizqlserver` log files for "workgroup-auth-mode":

- In a ziplog archive, these logs are in the `\vizqlserver\Logs` folder
- On the Tableau Server, these logs are in the `\data\tabsvc\vizqlserver\Logs` folder

Look for "workgroup-auth-mode" in the log files. It should say "kerberos-impersonate" not "as-is".

**Kerberos delegation multi-domain configuration**

Tableau Server has the ability to delegate users from other Active Directory domains. If your database uses MIT Kerberos, you may need to adjust your Kerberos principal to database user mapping. Specifically, you will need to update krb5.conf with rules for each Kerberos
realm that users will connect from. Use the auth_to_local tag in the [realms] section to map principal names to local user names.

For example, consider a user, EXAMPLE\jsmith, whose Kerberos Principal is jsmith@EXAMPLE.LAN. In this case, Tableau Server will specify a delegated user, jsmith@EXAMPLE. Tableau Server will use the Active Directory legacy domain alias as the Kerberos Realm.

The target database may already have a rule such as the following to map the user, jsmith@EXAMPLE.LAN to the database user, jsmith.

```
EXAMPLE.LAN = {
    RULE:[1:$1@$0](.*@EXAMPLE.LAN)s/@.*//
    DEFAULT
}
```

To support delegation, you must add another rule to map jsmith@EXAMPLE to a database user:

```
EXAMPLE.LAN = {
    RULE:[1:$1@$0](.*@EXAMPLE.LAN)s/@.*//
    RULE:[1:$1@$0](.*@EXAMPLE)s/@.*//
    DEFAULT
}
```

See the MIT Kerberos Documentation topic, krb5.conf, for more information.

OpenID Connect

You can configure Tableau Server to support OpenID Connect for single sign-in (SSO). OpenID Connect is a standard authentication protocol that lets users sign in to an identity provider (IdP) such as Google. After they've successfully signed in to their IdP, they are automatically signed in to Tableau Server.

Configuring OpenID Connect involves several steps. The topics in this section provide general information about using Tableau Server with OpenID Connect, and provide a sequence for configuring the IdP and Tableau Server.
Authentication overview

This section describes the OpenID Connect authentication process with Tableau Server.

**Step 1:** A user requests a resource on Tableau Server.

**Step 2:** Tableau Server redirects the request to the IdP gateway for authentication.

**Step 3:** The user is prompted and successfully authenticates with the IdP. The IdP redirects the session back to Tableau Server. Included with the URL is an authorization code for the user.

**Step 4:** Tableau Server presents the user’s authorization code back to the IdP. As an IdP client, the Tableau Server includes its own client credentials to prevent spoofing.

**Step 5:** The IdP returns an access token and an ID token to Tableau Server.

- The access token contains an encrypted key to verify that the IdP isn't being spoofed. The process the key is used for is referred to as JSON Web Token (JWT) validation. The key for JWT is specified in the jwks_uri in the IdP discovery document. If your IdP does not support JWT validation, then you can disable it. See "viz-portal.openid.ignore_jwk" in the tabadmin set options topic.

- The ID token is a set of attribute key-pairs for the user. The key-pairs are called
**claims.** Here is an example IdP claim for a user:

```
"sub" : "7gYhRR3HiRRCaRcgvY50ubrtjGQBMJW4rXbpPFp-g2cptHP62m2sqowM7G1LwjN5"
"email" : "alice@tableau.com",
"email_verified" : true,
"name" : "Alice Adams",
"given_name" : "Alice",
"family_name" : "Adams",
"phone_number" : "+359 (99) 100200305",
"profile" : "https://tableau.com/users/alice"
```

**Step 6: Tableau identifies user from IdP claim.** Tableau Server searches the user account records stored in the repository. By default, Tableau Server will use the subject identifier, or sub, claim to identify a user account. If no user record is storing the sub claim value, then Tableau Server will search for username matches using the email claim. When a username match is found, Tableau Server will write the corresponding sub claim to the user record in the repository. You can configure Tableau Server to use different claims for this process. See Requirements for Using OpenID Connect.

**Step 7: Tableau Server authorizes the user.**

Requirements for Using OpenID Connect

This topic describes the requirements to use OpenID Connect with Tableau Server.

**IdP account**

You must have access to an identity provider (IdP) that supports the OpenID Connect (OIDC) protocol. You must also have an account with the IdP. OpenID Connect is supported by many identity providers. The OIDC protocol is an open and flexible standard, and as such, not all implementations of the standard are identical. As you configure Tableau Server for OIDC, work with your IdP.
The Google IdP implementation has been extensively tested with Tableau Server and is the model IdP for the configuration documented in these topics.

Local authentication

To use OpenID Connect on Tableau Server, the server must be configured to use local authentication—that is, the server must be configured so that you explicitly create users on the Tableau Server, rather than importing them from Active Directory. Active Directory authentication is not supported with OpenID.

IdP claims: mapping users

To sign in successfully to Tableau Server, a given user must be provisioned in OpenID and then mapped to a user account on Tableau Server. OpenID uses a method that relies on claims to share user account attributes with other applications. Claims include user account attributes such as email, phone number, given name, etc. To understand how Tableau Server maps IdP claims to user accounts, see Authentication overview.

Tableau Server relies on the IdP claims to map user accounts from the IdP to those hosted on Tableau Server. By default, Tableau Server expects the IdP to pass the email claim. Depending on your IdP, you may need to configure Tableau Server to use a different IdP claim.

If you are using Google as an IdP, then use the default, email claim to map IdP identities to Tableau Server user accounts. If you are not using Google as an IdP, then work with your IdP to determine the claim for which you should configure Tableau Server.

Default: using email claim to map users

By default, the user’s user name in Tableau Server must match the email claim in the IdP ID token. Therefore, in the default configuration, you must use email addresses (also referred to as UPN) as the username in Tableau Server. If you use Google as the IdP, the user name in Tableau Server must be the user’s Gmail address (alice@gmail.com). Using a complete email address helps to guarantee the uniqueness of the user name in Tableau Server, even when two users have the same email but are on different email hosts.
**Note:** When you create a user identity in Tableau Server, you specify a user name, password, and optionally an email address. For using OpenID Connect in the default configuration, the user name (expressed as an email address) is the value that must match the user's name in the IdP. The optional email address in the Tableau Server user identity is not used for OpenID authentication.

Ignoring the domain name

You can configure Tableau to ignore the domain portion of an email address when matching the IdP email claim to a user account on Tableau Server. In this scenario, the email claim in the IdP might be alice@example.com, but this will match a user named alice in Tableau Server. Ignoring the domain name might be useful if you already have users defined in Tableau Server that match the user names portion of the email claim, but not the domain portions.

**Important:** We do not recommend ignoring the user domain name without taking precautions. Specifically, verify that user names are unique across the configured domains that you've created in your IdP.

Setting Tableau Server to ignore the user domain name has the potential to result in unintended user log on. Consider the case where your IdP has been configured for multiple domains (example.com and tableau.com). If two users with the same first name, but different user accounts (alice@tableau.com and alice@example.com) are in your organization, then the first one to complete the OpenID provisioning sequence will claim the `sub` mapping in the IdP. If the wrong user is mapped, then the other user will be unable to log on until the associated `sub` value is reset.

To configure Tableau Server to ignore domain names in user names from the IdP, use the following sequence of `tabadmin` commands:

```
tabadmin stop
tabadmin set vizportal.openid.ignore_domain true
```
tabadmin configure

tabadmin start

When you change the `vizportal.openid.ignore_domain` setting to ignore the domain in user names, all user names in Tableau Server must have a domain name.

Using custom claims to map users

As referenced in Authentication overview, the `sub` claim is often included in IdP claims. Typically, the `sub` claim is a unique string that identifies a given user account. The benefit of using a `sub` claim is that it will not change, even if you or another admin updates other user attributes or IdP claims (email, phone number, etc) associated with that account. By default, Tableau Server identifies and verifies OpenID users according to the `sub` claim in the IdP ID token.

The OpenID `sub` claim value must be mapped to the corresponding user in Tableau Server. Since the `sub` claim is an arbitrary string, a different claim is used to associate accounts during the first sign-in session. The first time a user signs in to Tableau Server with OpenID, Tableau will match the OpenID user account to a corresponding user account on Tableau. By default, Tableau will use the IdP claim, `email`, to identify the Tableau user. Tableau will then update that user’s record with the `sub` claim from OpenID. Since the ID token always includes the `sub` claim along with other claims, on subsequent sessions, Tableau will identify that user with the `sub` claim only.

For some organizations, mapping user names with the email address is not reliable or not supported by the IdP. Beginning with Tableau Server 10.2, you can map user accounts from any arbitrary IdP claim to the Tableau Server username.

The IdP claim you are using must map exactly to a corresponding Tableau Server username. In the example below, the username is `kwilliams`.
To change the IdP claim that is used to map identity on Tableau Server, use the following sequence of `tabadmin` commands:

```
tabadmin stop
  tabadmin set vizportal.openid.username_claim arbitraryClaim
  tabadmin configure
  tabadmin start
```

Where `arbitraryClaim` is the name of the IdP claim that you want to use for mapping OpenID accounts to existing Tableau Server usernames.

**Changing the sub claim**

As described above, the `sub` claim is the identifier that Tableau Server uses to identify users after the initial mapping session. The `sub` claim is written to the corresponding user account
in Tableau Server. If your IdP does not provide a sub claim, then you can specify an arbitrary claim to use instead. Like sub, the claim value you specify must be unique and should not change when other user claims are updated.

To specify a different IdP claim for default sub claim, use the following sequence of tabadmin commands:

```
tabadmin stop
  tabadmin set vizportal.openid.id_claim arbitraryClaim
  tabadmin configure
  tabadmin start
```

Where arbitraryClaim is the name of the IdP claim that you want to use as the replacement for the sub claim.

How Tableau Server Works with OpenID Connect

OpenID Connect is a flexible protocol that supports many options for the information that's exchanged between a service provider (here, Tableau Server) and an IdP. The following list provides details about the Tableau Server implementation of OpenID Connect. These details can help you understand what types of information Tableau Server sends and expects, and how to configure an IdP.

- Tableau Server supports only the OpenID Authorization Code Flow as described in the OpenID Connect final specification.
- Tableau Server does not support using OpenID Connect to sign in from mobile devices.
- Tableau Server relies on using discovery or a provider URL to retrieve the OpenID Provider metadata. Alternatively, you can host a static discovery document on Tableau Server. For more information see Configure Tableau Server for OpenID Connect.
- Tableau Server supports only the client_secret_jwt Client Authentication
method specified in the OpenID Connect specification. In addition, Tableau Server supports only RSA Asymmetric Encryption for handling the JWT. However, you can turn off JWT validation. See "vizportal.openid.ignore_jwk" in the tabadmin set options topic.

- Tableau Server expects a kid value in the id_token attribute's JOSE Header. This value is matched with one of the keys found in the JWK Set document, whose URI is specified by the jwks_uri value in the OpenID discovery document. A kid value must be present even if there is only one key in the JWK Set document.

- Tableau Server does include OpenID support for the JWK x5c parameter or for using X.509 certificates.

For more information about OpenID Connect, see the following:

- OpenID Connect Core 1.0 incorporating errata set 1
- OpenID Connect Discovery 1.0 incorporating errata set 1

Configure the Identity Provider (IdP) for OpenID Connect

This topic provides information about configuring an identity provider (IdP) to use OpenID Connect with Tableau Server. This is one step in a multi-step process. The following topics provide information about configuring and using OpenID Connect with Tableau Server.

- OpenID Connect
- Configure the Identity Provider (IdP) for OpenID Connect (you are here)
- Configure Tableau Server for OpenID Connect
- Signing In to Tableau Server Using OpenID Connect
- Changing IdPs in Tableau Server for OpenID Connect
Configure the IdP

Before you can use OpenID Connect with Tableau Server, you must have an account with an IdP and a project or application with the IdP. When you configure Tableau Server, you will need to be able to provide the following information:

- Provider client ID. This is the identifier that the IdP assigned to your application.
- Provider client secret. This is a token that is used by Tableau to verify the authenticity of the response from the IdP. This value is a secret and should be kept securely.
- Provider configuration URL. This is the URL at the provider's site that Tableau Server should send authentication requests to.

The following procedure provides an outline of the steps that you follow with the provider. As an example, the procedure discusses using Google as a provider. However, each provider has a somewhat different flow, so the specifics of the steps (and their order) might vary depending on your provider.

1. Register at the provider’s developer site and sign in. For example, for Google, you can go to the Developers Console at this URL: https://console.developers.google.com

2. Create a new project, application, or relying party account.

3. In the developer dashboard, follow the steps for getting an OAuth 2.0 client ID and client secret. Record these values for later.

   Note: Keep the client secret in a secure place.

4. On the developer site, find the URL of the endpoint that the IdP uses for OpenID Connect discovery. For example, Google uses the URL https://accounts.google.com/.well-known/openid-configuration. Record this URL for later.

Alternatively, if your IdP has provided you with a static discovery document, copy that file to a local directory on the Tableau Server for later.
The IdP configuration requires an additional step that you cannot finish until after you’ve configured Tableau Server, as described in Configure Tableau Server for OpenID Connect.

Configure Tableau Server for OpenID Connect

This topic describes how to configure Tableau Server to use OpenID Connect for single-sign on (SSO). This is one step in a multi-step process. The following topics provide information about configuring and using OpenID Connect with Tableau Server.

- OpenID Connect
- Configure the Identity Provider (IdP) for OpenID Connect
- Configure Tableau Server for OpenID Connect (you are here)
- Signing In to Tableau Server Using OpenID Connect
- Changing IdPs in Tableau Server for OpenID Connect

**Note:** Before you perform the steps described here, you must configure the OpenID identity provider (IdP) as described in Configure the Identity Provider (IdP) for OpenID Connect.

Important notes

Before you configure Tableau Server for OpenID Connect, make sure you read these notes.

- You can use OpenID Connect with Tableau Server only if the server is configured to use local authentication. OpenID Connect is not available if the server is configured to use Active Directory authentication. For more information, see Configure General Server Options.

- If you are configuring Tableau Server for the Salesforce IdP, then you must set the `vizportal.openid.client_authentication` parameter. See `tabadmin set`
We recommend that you configure Tableau Server to use SSL for external communications. This helps to maintain secure communications between Tableau Server and the IdP during the exchange of authentication information. For details, see Configure External SSL.

If your IdP uses a self-signed certificate (or the IdP certificate is not signed by a trusted CA), then you can add the IdP public certificate to the Java truststore. See Configuring Tableau Server for OpenID Connect Using Uncommon or Self-Signed Certificates.

If you are configuring OpenID Connect during the initial configuration of Tableau Server (the first time the configuration utility runs), there is no option to set up SSL. In that case, we recommend that you finish the installation, then return to the configuration to set up SSL and then configure OpenID.

**Note** If you want to use external SSL for Tableau Server, it's generally more convenient to do that before you configure OpenID Connect. If you configure SSL after you've already configured OpenID, you need to return to the IdP and update the configuration that you made previously. For example, you need to change the protocol for the Tableau Server external URL from http:// to https://.

Configure the server

To configure Tableau Server for OpenID Connect, follow these steps.

1. Log in as an administrator to the computer where Tableau Server is running.
2. If the server is running, stop it (Windows Start > **All Applications** > **Tableau Server** > **Stop Tableau Server**).
3. Run the Tableau Server Configuration tool (Windows Start > All Applications > Tableau Server > Configure Tableau Server).

4. Click the OpenID tab.

5. Select the Use OpenID Connect for single sign-on option.

6. Fill in the Provider client ID and Provider client secret boxes with the values you recorded earlier.

7. In the Provider configuration URL box, enter the URL that the IdP uses for OpenID Connect discovery.

   Alternatively, you can configure Tableau Server to reference a static discovery document to configure OpenID. The discovery file is a JSON document that defines the IdP configuration. Copy the file to the Tableau Server and then run the following sequence of tabadmin commands:

   ```
   tabadmin stop
   tabadmin set vizportal.openid.static_file <file-path>
   tabadmin configure
   tabadmin start
   ```

   Where `<file-path>` is the full path of the discovery file, for example, `c:\files\openid-configuration`.

8. In the Tableau Server external URL box, enter the URL of your server. This is typically the public name of your server, such as `http://example.tableau.com`.

   When you initially configure OpenID, the Provider configuration URL box contains a default value that's constructed based on the name of the server (
gateway.public.host) and the gateway port, if any (gateway.public.port). In addition, by default the protocol is set to https:// if SSL is enabled for the server.

**Note:** Make sure that you update the external URL if the default value is not the URL for how your server can be reached from an external source.

9. Copy the URL in the box labeled **Configure the OpenID provider using the following redirect URL for Tableau Server.** You’ll use this value in the next procedure to finish configuring the IdP.

10. Start the server (Windows Start > **All Applications** > **Tableau Server** > **Start Tableau Server**).

    **Tip:** You can also start the server by using the tabadmin start command.
Add the redirect URL to the IdP configuration

After you configure Tableau Server, you finish the IdP configuration using the server’s redirect URL.

1. Return to the IdP portal where you set up the project or application.
2. Edit the project configuration and find the redirect URL.
3. Enter the redirect URL that you copied in the previous procedure.

Signing In to Tableau Server Using OpenID Connect

This topic provides information about signing in to Tableau Server using OpenID Connect. The following topics provide information about configuring and using OpenID Connect with Tableau Server.

- OpenID Connect
- Configure the Identity Provider (IdP) for OpenID Connect
- Configure Tableau Server for OpenID Connect
- Signing In to Tableau Server Using OpenID Connect (you are here)
- Changing IdPs in Tableau Server for OpenID Connect

Signing in using OpenID Connect

Once Tableau Server has been configured to use OpenID Connect, users who access the server and aren't already signed in are redirected to the IdP site, where they are prompted to sign in. Users enter the credentials that they have with the IdP. In many cases, the user is also asked to authorize the IdP to share information with Tableau Server, as in the following example:
When a user signs in using OpenID Connect, the IdP sends a unique user identifier (known in OpenID as the sub value) as part of the information that's redirected to Tableau Server. This sub value is associated with the user's Tableau user identity.

**Note:** Tableau Server does not support using OpenID Connect to sign in from mobile devices.

Restricting sign-in to server administrators for command-line tools

Command-line tools for working with Tableau Server (tabcmd, tabadmin, and tableau-\_com) do not support sign-in using OpenID Connect. When OpenID Connect is enabled for the server, these tools still require sign-in using a Tableau Server username and password.

Even if users normally authenticate using OpenID Connect, each user has a Tableau Server username and password. This means that users could use command-line tools like tabcmd. As a security measure, you can make sure that only server administrators can use
command-line tools. To do this, use `tabadmin set wgserver.authentication.restricted to true`. When this setting is true, only server administrators can sign in to Tableau Server using a username and password; all other users must sign in to the server using a single sign-on (SSO) option like OpenID Connect. The effect is that users who are not administrators also cannot then use command-line tools. To make this change, do the following:

1. Stop the server.

2. Run the following sequence of `tabadmin` commands:

   ```bash
   tabadmin set wgserver.authentication.restricted true
   tabadmin configure
   ```

3. Start the server.

Changing IdPs in Tableau Server for OpenID Connect

This topic provides information about changing an identity provider (IdP) if you have configured Tableau Server to use OpenID Connect. The following topics provide information about configuring and using OpenID Connect with Tableau Server.

- OpenID Connect
- Configure the Identity Provider (IdP) for OpenID Connect
- Configure Tableau Server for OpenID Connect
- Signing In to Tableau Server Using OpenID Connect
- Changing IdPs in Tableau Server for OpenID Connect (you are here)

Changing providers

You might decide to change the IdP that Tableau Server is configured to use. To do so, you follow the procedure that you used to configure the first IdP: establish an account, get a customer ID and secret, configure Tableau Server with that information, and provide the IdP
with the redirect URL for Tableau Server. For more information, see Configure Tableau Server for OpenID Connect.

However, you also need to perform an additional step: you must clear any user identifiers (sub values) that have already been associated with Tableau Server users. The new IdP will have different sub values for each user, and you must clear the existing ones so that Tableau Server can store a new sub value when the user signs in using the new IdP.

To clear sub values for users, use the `tabadmin reset openid_sub` command. You can reset (that is, clear) sub values for an individual user, as in the following example:

```
tabadmin reset openid_sub --username Alice
```

You can also clear the sub value for all users using this command:

```
tabadmin reset openid_sub --all
```

**OpenID Connect Authentication Request Parameters**

The OpenID authentication request sent from Tableau Server passes information using a limited set of parameters, as listed in this topic. If your OpenID IdP requires parameters that are not on the list above, it is not compatible for use with Tableau Server.

- **scope**. This value specifies a profile that tells the IdP what user information claims to return. This value can be configured by a Tableau Server administrator. The default value is "openid email profile". For more information, see Configure the scope value later in this document.

- **response_type**. OpenID Connect supports multiple flows. This value tells the IdP which flow Tableau Server expects. Tableau supports only the authorization code flow, and the value is always set to "code".

- **client_id**. This value specifies the server’s ID (Provider client ID in the Tableau Server Configuration dialog box), which lets the IdP knows where the request came from. It is provided by the IdP when the service is registered. The value is configurable.
by a Tableau Server administrator.

- **redirect_uri.** This value specifies the URL that the IdP redirects to after the user has authenticated using OpenID Connect. The URL must include the host and protocol (for example, http://example.tableau.com), but Tableau provides the URL endpoint.

- **nonce.** Tableau Server generates a nonce value to verify that the client that it redirected to matches the entity that comes back from the IdP.

Configure the scope value

The **scope** value indicates to the IdP the information that Tableau Server requests about the user. By default, Tableau Server sends the value "openid profile email". This indicates that Tableau uses OpenID to authenticate (this part of the **scope** attribute value must always be included) and that Tableau Server is requesting the user profile and email information during the exchange of the user authorization code.

If this default scope is not appropriate for your scenario, you can have Tableau Server request custom information about the user. To do so, you configure the IdP with a custom profile (for example, something like "tableau-scope"). You can then configure Tableau Server to send the scope request using the name of the custom profile.

To change the **scope** value that Tableau Server requests, use the following tabadmin command:

```
tabadmin set vizportal.openid.custom_scope custom-scope-name
```

**Note:** Tableau Server always includes "openid" as part of the scope value (even if you don't include it in the **custom_scope** setting).

Troubleshoot OpenID Connect

Use the following topics to troubleshoot OpenID Connect (OIDC) issues in Tableau Server.
OpenID Connect protocol is supported by many identity providers. The OIDC protocol is an open and flexible standard, and as such, not all implementations of the standard are identical. Most issues that administrators encounter when configuring Tableau Server for OIDC are the result of how different identity providers implement OIDC. If you encounter errors as you set up OIDC with Tableau Server, we recommend that you work with your IdP to resolve them.

Signing In from the Command Line

Even if Tableau Server is configured to use OpenID, it is not used if you sign in to Tableau Server using tabcmd, the REST API, or the Tableau Data Extract command line utility (provided with Tableau Desktop).

Login Failed

Login can fail with the following message:

```
Login failure: Identity Provider authentication successful for user <username from IdP>. Failed to find the user in Tableau Server.
```

This error typically means that there is a mismatch between a username stored in Tableau Server and the username provided by the IdP. To fix this, make sure that they match. For example, if Jane Smith’s username is stored in the IdP as jsmith it must be stored in Tableau Server as jsmith as well.

Error 69: "Unable to Sign In"

An error 69 may be returned when you attempt to sign in to Tableau Server with a web browser and receive an error, "Unable to Sign In. Sign in failed. Contact your Tableau Server administrator." The URL that returns this message is https://example.com/#/error/signin/69?redirectPath=%2.

If you receive this error and you have configured OIDC for the Salesforce IdP, then you must set the `vizportal.openid.client_authentication` parameter. See `tabadmin set options` for more information.
OpenID Error Log

OpenID authentication takes place outside Tableau Server, so troubleshooting authentication issues can be difficult. However, sign-in attempts are logged by Tableau Server. You can create a snapshot of log files and use them to troubleshoot problems. For more information, see Archive Log Files.

**Note:** To log OpenID-related events, `vizportal.log.level` must be set to `debug`. For more information, see Change Logging Levels.

Check for OpenID errors in the following files in the unzipped log file snapshot:

\vizportal\vizportal-<n>.log

**Trusted Authentication**

When you embed Tableau Server views into webpages, everyone who visits the page must be a licensed user on Tableau Server. When users visit the page they are prompted to sign in to Tableau Server before they can see the view. If you already have a way of authenticating users on the webpage or within your web application, you can avoid this prompt and save your users from having to sign in twice by setting up trusted authentication.

Trusted authentication simply means that you have set up a trusted relationship between Tableau Server and one or more web servers. When Tableau Server receives requests from these trusted web servers it assumes that your web server has handled whatever authentication is necessary.

If your web server uses SSPI (Security Support Provider Interface), you do not need to set up trusted authentication. You can embed views and your users will have secure access to them as long as they are licensed Tableau Server users and members of your Active Directory.
**Note:** Client browsers must be configured to allow third-party cookies if you want to use trusted authentication with embedded views.

How Trusted Authentication Works

The diagram below describes how trusted authentication works between the client's web browser, your web server(s) and Tableau Server.

1. **User visits the webpage**: When a user visits the webpage with the embedded Tableau Server view, the webpage sends a GET request to your web server for the HTML for that page.

2. **Web server POSTS to Tableau Server**: The web server sends a POST request to the trusted Tableau Server (for example, `https://tabaserver/trusted`, not `https://tabserver`). That POST request must have a `username` parameter. The
username value must be the username for a licensed Tableau Server user. If Tableau Server is hosting multiple sites and the view is on a site other than the Default site, then the POST request must also include a target_site parameter.

3 **Tableau Server creates a ticket**: Tableau Server checks the IP address or host name of the web server (192.168.1.XXX in the above diagram) that sent the POST request. If the web server is listed as a trusted host then Tableau Server creates a ticket in the form of a unique string. Tickets must be redeemed within three minutes after they are issued. Tableau Server responds to the POST request with that ticket. Or if there is an error and the ticket cannot be created, then Tableau Server responds with a value of -1.

4 **Web server passes the URL to the browser**: The web server constructs the URL for the view and inserts it into the HTML for the page. The ticket is included (for example, https://tabserver/trusted/<ticket>/views/requested_view_name). The web server passes the HTML back to the client’s web browser.

5 **Browser requests view from Tableau Server**: The client web browser sends a GET request to Tableau Server that includes the URL with the ticket.

6 **Tableau Server redeems the ticket**: Tableau Server redeems the ticket, creates a session, logs the user in, removes the ticket from the URL, and then sends the final URL for the embedded view to the client.

The session allows the user to access any of the views that the user would have if they logged onto the server. In the default configuration, users authenticated with trusted tickets have restricted access such that only views are available. They cannot access workbooks, project pages, or other content hosted on the server. To change this behavior, see the wgserver.unrestricted_ticket option at tabadmin set options.
How is a trusted ticket stored?

As of version 10.2, Tableau Server stores trusted tickets in the Tableau Server repository using the following process:

1. Tableau Server generates a two-part ticket: the first part is a Base64-encoded unique ID (UUID) and the second part is a 24-character random secret string.
2. Tableau Server hashes the secret string and stores it with the unique ID in the repository. Hashing takes the secret string as input, and uses an algorithm to compute a unique string. This unique string protects the security of the secret string from unauthorized users.
3. Tableau Server sends the Base64 UUID and the original 24-character random string to the client.
4. The client returns the Base64 UUID and the original 24-character secret string to Tableau Server as part of the request for a view.
5. Tableau Server locates the string pair with the Base64 UUID, and then hashes the secret string to verify that it matches the hash stored in the repository.

This process ensures that any trusted ticket content stored on Tableau Server cannot be used to impersonate users or access content protected by authentication. However, because the full trusted ticket is sent over HTTP between Tableau Server and the client, the process relies on secure and encrypted transmission of HTTP data. Therefore, we recommend that you only deploy trusted tickets over SSL/TLS or another layer of network encryption.

Add Trusted IP Addresses or Host Names to Tableau Server

The first step in setting up trusted authentication is to configure Tableau Server to recognize and trust requests from one or more web servers:

1. Open a command prompt as an administrator and navigate to your Tableau Server bin directory (for example, C:\Program Files\Tableau\Tableau Server\10.2\bin).
2. Type the following command to stop Tableau Server:

   `tabadmin stop`

3. Next, type the following command:
tabadmin set wgserver.trusted_hosts "<trusted IP addresses or host names>"

In the command above, <trusted IP addresses> should be a comma-separated list of the IPv4 addresses or host names of your web server(s).

**Note:** The values you specify completely overwrite any previous setting. Therefore, you must include the full list of hosts in the `set` command. (You cannot amend the list of hosts by running the `set` command repeatedly.)

For example:

```
tabadmin set wgserver.trusted_hosts "192.168.1.101, 192.168.1.102, 192.168.1.103"
```

or

```
tabadmin set wgserver.trusted_hosts "webserv1, webserv2, webserv3"
```

**Notes:**
The comma separated list should be in quotes, with one space after each comma.
The web servers you specify must use static IP addresses, even if you use host names (learn more).

4. If you have one or more proxy servers between the computer that is requesting the trusted ticket (one of those configured in step 2, above) and Tableau Server, you also need to add them as trusted gateways. See Configure a reverse proxy server for steps.

5. Type the following command to save the changes to all the server configuration files:
tabadmin config

6. Finally, type the following command to start the server again:

    tabadmin start

Next, you need to **configure your web server to receive tickets from Tableau Server**.

### Get a Ticket from Tableau Server

After you’ve **added trusted IP addresses** to Tableau Server, you’re ready to configure your web server to get tickets from Tableau Server via POST requests (**step 3 in the diagram**).

The POST request must be sent to http://<server name>/trusted, **not** http://tabserv. For example **http://tabserv/trusted**.

**Note:** If SSL is enabled you must use https instead of http. For example: https://tabserver/trusted.

For code examples that you can use to create the POST request in Java, Ruby, and PHP, see the following:

C:\Program Files\Tableau\Tableau Server\10.2\extras\embedding

Here’s the data you can use in a POST request to Tableau Server:

- **username=<username>** (required): The username for a licensed Tableau Server user. If you are using Local Authentication the username can be a simple string (for example, username=jsmith). If you are using Active Directory with multiple domains you must include the domain name with the user name (for example, username=MyCo\jsmith).

- **target_site=<site id>** (required if view not on Default site): Specifies the site containing the view if Tableau Server is running **multiple sites** and the view is on a site other than the Default site (for example, target_site=Sales). The value you use
for `<site_id>` should be the Site ID that was provided when the site was created. This value is case sensitive. If the Site ID is `SAles`, then the `target_site=SAles`.

- `client_ip=<IP address>` (optional): Used to specify the IP address of the computer whose web browser is accessing the view (for example, `client_ip=123.45.67.891`). It is not the IP address of the web server making the POST request of Tableau Server. If you decide to use this parameter, see Optional: Configure Client IP Matching for more information.

Tableau Server’s response to the POST request will be a unique string (the ticket). If Tableau Server isn’t able to process the request, the return will be -1. See Ticket Value of -1 Returned from Tableau Server for tips on how to correct this. Also, in order for users to successfully authenticate when they click an embedded view, their browsers must be configured to allow third-party cookies.

The ticket format has changed in Tableau Server 10.2. The ticket format is now a string composed of two parts. Each part is a 128 bit string that is encoded before it is returned to the client. The first part is a universally unique ID (UUID v4) that is Base64-encoded. The second part is a 24-character secure random string. The concatenation of these parts can be expressed as Base64(UUIDv4):SecureRandomString. An example of a ticket might look like this: `9D1ObyqDQmSI0yQpKdy4Sw==:dg62gCsSE0QRArXNT0p6m1J5`.

Next, you need to add code that allows the web server to construct an URL for the view that includes the view’s location and the ticket.

Display the View with the Ticket

After you create the POST request, you need to write code that provides the web server with the view’s location and the ticket from Tableau Server. It will use this information to display the view. How you specify it depends on whether the view is embedded, and if Tableau Server is running multiple sites.
Tableau Server View Examples

Here’s an example of how to specify a view that users only access via Tableau Server (the view is not embedded):

http://tabserver/trusted/<ticket>/views/<workbook>/<view>

If Tableau Server is running multiple sites and the view is on a site other than the Default site, you need to add t/site ID to the path. For example:

http://t-abserver/trusted/<ticket>/t/Sales/views/<workbook>/<view>

Use the same capitalization that you see in the Tableau Server URL.

Embedded View Examples

Here are some examples of how to specify embedded views. Because there are two approaches you can take with embed code, both ways are provided below. Regardless of which you use, there is some information unique to trusted authentication that you must provide. For more information, search for "Writing Embed Code" in the Tableau Server Help.

Script Tag Examples

This example uses the ticket object parameter:

```html
<script type="text/javascript" src="https://myserver/javascripts/api/viz_v1.js"></script>
<object class="tableauViz" width="800" height="600" style="display:none;">
  <param name="name" value="MyCoSales/SalesScoreCard" />
  <param name="ticket" value="9D10byqDQmSI0yQpKdy4Sw==:dg62gCsSE0QRaRXNTOp6mlJ5" />
</object>
```

Here’s what the above example looks like for a multi-site Tableau Server, where the view is published on the Sales site:
Instead of using ticket, you can use the path parameter to state the full path of the view explicitly. When path is used, you do not also need the name parameter, which is usually a required parameter in Tableau JavaScript embed code:

```html
<object class="tableauViz" width="900" height="700" style="display:none;">
  <param name="site_root" value="/t/Sales" />
  <param name="name" value="MyCoSales/SalesScoreCard" />
  <param name="ticket" value="9D1ObyqDQmSIOyQpKdy4Sw==:dg62gCsSE0QRARXNTOp6mlJ5" />
</object>
```

Here's the same example, but for a multi-site server. Note that /t/<site ID> is used here:

```html
<object class="tableauViz" width="900" height="700" style="display:none;">
  <param name="path" value="true/sted/9D1ObyqDQmSIOyQpKdy4Sw==:dg62gCsSE0QRARXNTOp6mlJ5/views/MyCoSales/SalesScoreCard" />
</object>
```
Iframe Tag Example

<iframe src="https://tabserver/trusted/9D1ObyqDQmSI0yQpKdy4Sw==:dg62gCsSE0QRArXNT0p6mlJ5/views/workbookQ4/SalesQ4?:embed=yes" width="800" height="600"></iframe>

Optional: Configure Client IP Matching

By default, Tableau Server does not consider the client web browser IP address when it creates or redeems tickets. To change this, you need to do two things: specify an IP address using the client_ip parameter in the POST request that obtains the ticket, and follow the steps below to configure Tableau Server to enforce client IP address matching.

1. Open a command window and change directories to the location of Tableau Server’s bin directory. The default location is C:\Program Files\Tableau\Tableau Server\10.2\bin

2. Open a command prompt as an administrator and type the following command:

   `tabadmin set wgserver.extended_trusted_ipChecking true`

3. Then type the following command:

   `tabadmin configure`

4. Finally, restart the server by typing the following:

   `tabadmin restart`

Testing Trusted Authentication

The steps below detail a method for testing the retrieval of a trusted ticket from your web server. This simple test can help evaluate connectivity between the web server and Tableau Server, and whether or not trusted authentication has been configured correctly.
Step 1: Add web server IP address to wgserver.trusted_hosts tabadmin option

1. On the Tableau Server, open Command Prompt and Run as administrator.
2. In Command Prompt, navigate to the Tableau Server bin directory. For example:
   
   ```
   cd "C:\Program Files\Tableau\Tableau Server\Tableau Server-bin"
   ```

3. Specify the IP address of the trusted web server that will be proxying authentication requests to Tableau Server by running the following commands:

   ```
   tabadmin set wgserver.trusted_hosts <ip-address>
   tabadmin config
   tabadmin restart
   ```

   See tabadmin set options for more information about setting wgserver.trusted_hosts.

Step 2: Add a test user

Create a user on the Tableau Server that you can use to test trusted ticket functionality. See Add Users to the Server. Set the role of the user to Interactor.

Step 3: Create a test HTML page

Copy the following code and save as an html file on the web server that you specified in Step 1.

```html
<html>
<head>
<title>Trusted Ticket Requester</title>
<script type="text/javascript">
function submitForm(){document.getElementById('form1').action = document.getElementById('server').value + "/trusted";}
</script>
<style type="text/css">
.style1 {width: 100%;}
.style2 {width: 429px;}
```
<tr><td class="style2">Username:</td><td><input type="text" name="username" value="" /></td></tr>
<tr><td class="style2">Server:</td><td><input type="text" id="server" name="server" value="http://" /></td></tr>
<tr><td class="style2">Client IP (optional):</td><td><input type="text" id="client_ip" name="client_ip" value="" /></td></tr>
<tr><td class="style2">Site: (leave blank for Default site, else NameOfSite if using sites)</td><td><input type="text" id="target_site" name="target_site" value="" /></td></tr>
Step 4: Retrieve a trusted ticket from Tableau Server

The following procedure will return a trusted ticket from Tableau Server.

1. Open the web page that you created in Step 3. The web browser may prompt you to allow scripts to run. This operation requires Javascript.

2. In the text boxes, enter the following:
   - **Username**: The test user that was created in Step 2.
   - **Server**: the address of your Tableau Server, e.g., `https://server_name`. 
- Client IP (optional): The IP address of the user's computer (only if configured for client trusted IP matching).
- Site: The name of the Tableau Server site where test user is hosted.

3. Click Go. One of the following will be returned:
   - **A unique ticket**: A trusted ticket is a string composed of a base64-encoded UUID and a 24-character random string, for example, 9D10lxmDQmSIOyQpKdy4Sw==:dg62gCsSE0QRArXNTOp6mlJ5.
   - **-1**: If the value, -1 is returned, then there is an error in the configuration. See Ticket Value of -1 Returned from Tableau Server.

Step 5: Test access with trusted ticket

Now that you have a ticket, you can use it to access content on Tableau Server.

Construct a URL with the unique ticket that you generated in Step 4 to verify access with the trusted ticket. The URL syntax is different if you are accessing a Tableau Server with a single site vs a server that hosts multiple sites.

**Single (Default) site server url**

https://<Tableau Server name>/trusted/<unique ticket from Step 4>/views/<workbook>/<view>

**Non-default site server url**

https://<Tableau Server name>/trusted/<unique ticket from Step 4>/t/<site name where test user is hosted>/views/<workbook>/<view>

Variables in the URLs are encapsulated with angle brackets (< and >). All other syntax is literal.

Troubleshoot Trusted Authentication

This section includes some common issues and errors you might encounter when you're configuring trusted authentication. Trusted authentication information is written to ProgramData\Tableau\Tableau
Server\data\tabsvc\logs\vizqlserver\vizql-*.log. To increase the logging level from info to debug, use the tabadmin setting vizqlserver.trustedticket.log_level.

To test your trusted authentication deployment, see Testing Trusted Authentication.

Ticket Value of -1 Return from Tableau Server

Tableau Server returns -1 for the ticket value if it cannot issue the ticket as part of the trusted authentication process. The exact reason for this message is written to the vizql*.log files in the following folder:

ProgramData\Tableau\Tableau Server\data\tabsvc\logs\vizqlserver

Here are some things to confirm:

- **All web server host names or IP addresses are added to trusted hosts**

  The IP address or host name for the computer sending the POST request must be in the list of trusted hosts on Tableau Server. See Add Trusted IP Addresses or Host Names to Tableau Server to learn how to add IP addresses or host names to this list.

- **Value of wgserver.trusted_hosts is properly formatted**

  The list of trusted hosts you provided using the wgserver.trusted_hosts setting must be a comma-separated list with a space after each comma. For example, the list should be similar to the following: 192.168.1.101, 192.168.1.102, 192.168.1.103, or bigbox1.example.lan, bigbox2.example.lan, bigbox3.example.lan.

- **IP addresses are IPv4**

  If you are using IP addresses to specify trusted hosts, they must be in Internet Protocol version 4 (IPv4) format. An IPv4 address looks like this: 123.456.7.890. IPv6 addresses (for example, fe12::3c4a:5eab:6789:01c%34) are not supported as a way of inputting trusted hosts.

- **Username in POST request is a valid Tableau Server user**
The username you send in the POST request must be a licensed Tableau Server user with a Viewer or Interactor license level. You can see a list of users and their license levels by signing in to Tableau Server as an administrator and clicking the Licensing link on the left side of the page.

- **Username in POST request includes domain**

If Tableau Server is configured to use Local Authentication, the username that you send in the POST can be a simple string. However, if the server is configured for Active Directory you must include the domain name with the user name (domain\username). For example, the username parameter might be: `username=dev\jsmith`

- **Content-Type is specified**

If you are designing an ASP.NET or C# application, you need to declare the content type in your HTTP request. For example, `http.setRequestHeader("Content-Type","application/x-www-form-urlencoded; charset=UTF-8")`. If you do not specify content type and Tableau Server returns a 401, the log files contain the error: "missing username and/or client_ip".

**HTTP 401 - Not Authorized**

If you receive a 401- Not Authorized error, you may have configured Tableau Server to use Active Directory with SSPI (see Enable automatic login). If your web server uses SSPI, you do not need to set up trusted authentication. You can embed views and your users will have access to them as long as they are licensed Tableau server users and members of your Active Directory.

If you see a 401 error (or a 302 - Redirect error) after you have deployed Tableau Server 10.2, then it's likely the trusted ticket code you have written to construct the URL for the client has not been updated to account for the two-part ticket URL format. See Get a Ticket from Tableau Server.
HTTP 404 - File Not Found

You may receive this error if your program code references a Tableau Server URL that does not exist. For example, your web server may construct an invalid URL that cannot be found when the webpage tries to retrieve it.

Invalid User (SharePoint or C#)

You may encounter this error if you’ve configured Tableau Server for trusted authentication.

The example code for the SharePoint .dll references the following GET request:

```
```

The above request will return the display name of the current Windows Active Directory user. If you want to use the login ID, then you will need to change the code to:

```
```

After you make the change, recompile the SharePoint .dll.

Attempting to Retrieve the Ticket from the Wrong IP Address

You may encounter this error if you’ve configured Tableau Server for trusted authentication.

The client web browser IP address is not considered by default when redeeming the ticket. If Tableau Server is configured to enforce client IP address matching, make sure that the client’s web browser IP address that is sent in the POST to Tableau Server is the same as when the browser tries to retrieve the embedded view. For example, in the Trusted Authentication diagram, if the POST request in step 3 sends the parameter client_ip=74.125.19.147, then the GET request in step 5 must come from that same IP address.

See Optional: Configure Client IP Matching to learn how to configure Tableau Server to enforce client IP address matching.

Cookie Restriction Error

When a user signs in to Tableau Server, a session cookie is stored in their local browser. The stored cookie is how Tableau Server maintains that the signed in user has been
authenticating and can access the server. Because the cookie is set with the same domain or sub-domain as the browser's address bar, it is considered a first-party cookie. If a user’s browser is configured to block first-party cookies, they will be unable to sign in to Tableau Server.

When a user signs in to Tableau Server via an embedded view, or in an environment where trusted authentication has been configured, the same thing happens: a cookie is stored. In this case, however, the browser treats the cookie as a third-party cookie. This is because the cookie is set with a domain that's different from the one shown in the browser's address bar. If a user’s web browser is set to block third-party cookies, authentication to Tableau Server will fail. To prevent this from occurring, web browsers must be configured to allow third-party cookies.

An error occurred communicating with the server (403)

If Tableau Server is configured for trusted authentication, you may receive this error after opening a new view in a browser and attempting to navigate back to views you’d opened earlier. Tableau Server provides protection against unauthorized reuse of VizQL sessions through the tabadmin set option `vizqlserver.protect_sessions`, which is set to `true` by default. Because Tableau Server is configured for trusted authentication, you may not also need to enable `vizqlserver.protect_sessions`. To disable it, use `set` to change it to `false`.

**SQL Server Impersonation**

Impersonation in the context of Tableau Server means allowing one user account to act on behalf of another user account. You can configure Tableau and Microsoft SQL Server to perform database user impersonation, so that the SQL Server database account used by Tableau Server queries on behalf of SQL Server database users, who are also Tableau users.

The main benefit of this feature is it allows administrators to implement and control their data security policy in one place: their databases. When Tableau users access a view with a live connection to a SQL Server database, the view only displays what the users' database
permissions authorize them to see. An additional benefit is that the users don't have to respond to a database sign-in prompt when they open the view. Also, workbook publishers don't have to rely on user-specific filters to restrict what's seen in views.

Impersonation Requirements

Here's what you need to use feature:

- **Live connections to SQL Server only**: Impersonation can only be used for views that have a live connection to a SQL Server database, version 2005 or newer.

- **Individual database accounts**: Each person who'll be accessing the view must have an explicit, individual account in the SQL Server database to which the view connects. Members of an Active Directory (AD) group cannot be impersonated. For example, if Jane Smith is a member of the AD group Sales, and her database administrator adds the Sales AD group to the SQL Server database, Jane cannot be impersonated.

- **Matching credentials and authentication type**: The credentials of each Tableau user's account and their Tableau user authentication type must match their credentials and authentication type in the SQL Server database. In other words, if Jane Smith's Tableau Server user account has a username of MyCo\jsmith and Tableau Server is using Active Directory for user authentication, her username on the SQL Server database must also be MyCo\jsmith and SQL Server must be using Windows Integrated Authentication.

- **SQL Server prerequisites**: In SQL Server you should have a data security table, a view that enforces data security, and you should require that your database users use the view.

- **SQL IMPERSONATE account**: You need a SQL Server database account that has IMPERSONATE permission for the above database users. This is either an account with the sysadmin role or one that has been granted IMPERSONATE permission for each individual user account (see the [MSDN article on EXECUTE AS](https://docs.microsoft.com/en-us/sql/express/msdb-instance/system-registry-security-execution-as)). This SQL Server account must also be one of two accounts on the Tableau side of things:
- The Tableau Server Run As User account (see Impersonate with a Run As User Account).

- The workbook publisher’s account (see Impersonate with Embedded SQL Credentials).

How Impersonation Works

Here’s an illustration of how database user impersonation works:

In the above illustration, Jane Smith (MyCo\jsmith) is a West Coast sales representative and Henry Wilson (MyCo\hwilson) covers the East. In the SQL Server database, the account permissions for Jane’s account, MyCo\jsmith, only give her access to West Coast data. Henry’s account, MyCo\hwilson, can only access data for the East Coast.

A view has been created that displays data for the entire country. It has a live connection to a SQL Server database. Both users sign in to Tableau Server and click the view. Tableau Server connects to SQL Server using a database account with IMPERSONATE permission for each user’s database account. This account acts on behalf of each user’s database account.
When the view displays, it is restricted by each user’s individual database permissions: Jane sees only the West Coast sales data, Henry sees only the East Coast data.

Impersonate with a Run As User Account

Impersonating via a Run As User account is the recommended way to perform impersonation. The Run As User account is an Active Directory (AD) account the Tableau Server service can run under on the machine hosting Tableau Server (see Run As User). This same account must have IMPERSONATE permission for the database user accounts in SQL Server. From a data security standpoint, using the Tableau Server Run As account for impersonation gives the administrator the most control.

To set up impersonation with a Run As User account:

1. When you configure Tableau Server as part of Setup, under Server Run As User, enter the Run As User AD account that has IMPERSONATE permission for the user accounts. Under User Authentication, select Use Active Directory:
2. Click **OK** to finish configuration.

3. Create a workbook in Tableau Desktop. When you create the data connection, select **Use Windows NT Integrated security** for the workbook’s live connection to a SQL Server database:

   ![SQL Server Connection](image)

4. In Tableau Desktop, publish the workbook to Tableau Server (**Server > Publish Workbook**).

5. In the Publish dialog box, click Authentication, then in the Authentication dialog box, select **Impersonate via server Run As account** from the drop-down list:
6. Click **OK**.

7. Test the connection by signing into Tableau Server as a user. When you click a view, you should not be prompted for database credentials and you should only see the data the user is authorized to see.

**Impersonate with Embedded SQL Credentials**

You can also perform impersonation by having the person who publishes a view embed their SQL Server account credentials in the view. Tableau Server can be running under any type of account, but it will use these credentials, supplied by the publisher, to connect to the database.
This may be the right choice for your site if the account that handles the impersonation cannot be an Active Directory (AD) account and if you’re comfortable giving workbook publishers an account with a potentially high permission level on SQL Server.

**Note:**

To use this approach, *Embedded Credentials* must be enabled on the server Settings page in Tableau Server:

*Embedded Credentials*

Users can attach data source credentials to a workbook; people then connect to the workbook data.

- Allow embedded credentials

To impersonate with the workbook publisher’s SQL account:

1. In Tableau Desktop, create a workbook. When you create the data connection, select **Use a specific username and password for the workbook’s live connection to a SQL Server database:**

   ![SQL Server Connection](image)

2. Publish the workbook to Tableau Server (**Server > Publish Workbook**).

3. In the Publish dialog box, click Authentication, then in the Authentication dialog box,
select **Impersonate via embedded password** from the drop-down list:

4. Click **OK**.

5. Test the connection by signing in to Tableau Server as a user. When you click a view, you should not be prompted for database credentials and you should only see the data the user is authorized to see.

**OAuth Connections**

For Google BigQuery, Google Analytics, Salesforce.com, and some web data connector data sources, an alternative to storing your sensitive database credentials with Tableau Server is to create connections using the **OAuth 2.0** standard.
From Tableau, when you sign in to data with a provider that uses OAuth, you are redirected to the provider’s sign-in page. After you provide your credentials and authorize Tableau to access your data, the data provider sends Tableau an **access token** that uniquely identifies requests from Tableau. For more information, see Overview of the OAuth process below.

Using OAuth connections provides the following benefits:

- **Security**: Your database credentials are never known to or stored in Tableau Server, and the access token can be used only by Tableau.

- **Convenience**: Instead of having to embed your data source ID and password in multiple places, you can use the token provided for a particular data provider for all published workbooks and data sources that access that data provider.

  In addition, for live connections to Google BigQuery data, each workbook viewer can have a unique access token that identifies the user, rather than sharing a single user name and password credential.

**Overview of the OAuth process**

The following steps describe a workflow in the Tableau environment that calls the OAuth process.

1. You take an action that requires access to a cloud data source.
   
   For example, you open a workbook that’s published to Tableau Server.

2. Tableau directs you to the cloud data provider’s sign-in page. The information that is sent to the data provider identifies Tableau as the requesting site.

3. When you sign in to the data, the provider prompts you to confirm your authorization for Tableau Server to access the data.

4. Upon your confirmation, the data provider sends an access token back to Tableau Server.
5. Tableau Server presents your workbook and data to you.

The following workflows can use the OAuth process:

- Creating a workbook and connecting to the data source from Tableau Desktop or from Tableau Server.
- Publishing a data source from Tableau Desktop.
- Signing in to Tableau Server from an approved client, such as Tableau Mobile or Tableau Desktop.

Access tokens for data connections

You can embed credentials based on access tokens with data connections, to enable direct access after the initial authentication process. An access token is valid until a Tableau Server user deletes it, or the data provider revokes it.

It is possible to exceed the number of access tokens your data source provider allows. If that's the case, when a user creates a new token, the data provider uses length of time since last access to decide which token to invalidate to make room for the new one.
Access tokens for authentication from approved clients

By default, Tableau Server sites allow users to access their sites directly from approved Tableau clients, after users provide their credentials the first time they sign in. This type of authentication also uses OAuth access tokens to store the users’ credentials securely.

For more information, see Disable Automatic Client Authentication

Configure the Server for OAuth Support

Instead of individual usernames and passwords, OAuth works through limited-purpose access tokens. Before you can obtain access tokens needed to create an OAuth connection in Tableau, you need to configure your server so that the data provider sending the token can recognize Tableau Server as a trusted destination. The following section describes how to prepare for setting up OAuth regardless of your data provider. The topics listed below it contain the steps for configuring your server for specific data providers.

Preparing for Configuring OAuth Support

Before you begin the configuration steps specific to your data provider, complete the following prerequisites:

- Obtain the fully qualified domain name of each Tableau Server node that will host views that connect to this data source. For example:

  https://sales.your_domain.com

  If you use Salesforce.com, you will need to provide an https address.

- Make sure at least one of your data-provider accounts is enabled for API access.

  For Google data types, you need access to the developers console on the Google Cloud Platform.

  For Salesforce.com, you need access to the Force.com platform.

  For QuickBooks Online, you need access to the Intuit platform.
Configure Settings for Your Data Provider

When you complete the OAuth-preparation steps, you can configure the appropriate settings with your data provider.

- Set up OAuth for Google
- Set up OAuth for Salesforce.com
- Set up OAuth for QuickBooks Online

Set up OAuth for Google

This topic describes how to set up your Google BigQuery and Google Analytics data sources for OAuth. Complete these steps for each Tableau Server instance.

Note Before you complete these steps, make sure you have completed the pre-requisites described in Preparing for Configuring OAuth Support.

Set up OAuth by following these two procedures:

- Get required information from Google and enable API access.
- Use the information you obtained to configure your server.

Obtain a Client ID and Enable Google APIs

Note These steps reflect the settings in the Google Cloud Platform console at the time of this writing. For more information, see Using OAuth 2.0 for Web Server Applications in the Google Developers Console Help.

1. Sign in to Google Cloud Platform, and then click Go to my console.

2. On the drop-down menu next to the Google Cloud Platform title, select Create project.

3. In the new project form that appears, complete the following:
• Give the project a meaningful name that reflects the Tableau Server instance for which you’ll use this project.

• Determine whether you want to change the project ID.

**Note** After you create the project, you will not be able to change the project ID. For information, click the question mark icons.

4. Open the new project, and navigate to **APIs Manager > Credentials**.

5. Click the **OAuth consent screen** tab and then enter a meaningful name for **Product name** shown to users.

6. Click the **Credentials** tab, then click the **Create credentials** drop-down list, and then select **OAuth client ID**. Complete the following:

   • Select **Web Application**.

   • For **Authorized JavaScript Origins**, enter the local computer name of your Tableau Server.

   • For **Authorized Redirect URI**, replace the existing text with the Internet address for your server, and add the following text to the end of it: `auth/add`
**oauth_token.** For example:

https://your_server_url.com/auth/add_oauth_token

7. Copy the Authorized Redirect URI, and paste it in a location that you can access from your Tableau Server computer.

8. Click Create.

9. Copy the following values that Google returns, and paste them in a location that you can access from your Tableau Server computer:

   - Client ID
   - Client secret

10. In **APIs Manager > Dashboards**, verify that **BigQuery API** or **Analytics API** is enabled. To enable APIs, click **ENABLE API** at the top of the page.

Configure Tableau Server for Google OAuth

Using the information you obtained by completing the steps in Obtain a Client ID and Enable Google APIs, configure your Tableau Server:

1. On the Tableau Server computer, open the Command Prompt as an administrator and change to the Tableau Server bin directory.

   `cd C:\Program Files\Tableau\Tableau Server\<version>\bin`

2. Type the following command to stop the server:

   `tabadmin stop`

3. Type the following commands to configure the server with the client ID and client secret you obtained from Google, as well as your server URI. Press **Enter** after each command.

   `tabadmin set oauth.google.client_id <your_client_ID>`
tabadmin set oauth.google.client_secret <your_client_secret>

tabadmin set oauth.google.redirect_uri <yourAuthorized_redirect_URI>

4. Type the following commands to complete the configuration and restart the server:

   tabadmin config

   tabadmin start

Managing access tokens

After you configure the server for OAuth, you can allow users to manage their own access tokens in their profile settings, or you can manage the tokens centrally. For more information, see Allow Saved Access Tokens.

Set up OAuth for Salesforce.com

This topic describes how to set up your Salesforce.com data sources for OAuth. Complete these steps for each Tableau Server instance.

**Note:** Before you complete these steps, make sure you have completed the prerequisites described in Preparing for Configuring OAuth Support.

Set up OAuth by following these two procedures:

- Create a Connected App in Salesforce
- Use the information you obtained to configure your server.

Create a Connected Salesforce App

1. Sign in to your Salesforce.com developer account, click your user name in the upper-right, and then select **Setup**.
2. In the left navigation column, under App Setup, select Create > Apps.

3. In the Connected Apps section, click New.

4. Complete the Basic Information, and in the API section, select Enable OAuth Settings.

5. In the new OAuth settings that appear, for Callback URL, type the fully qualified domain name of your server, using the https protocol, and append the following text to the URL: auth/add_oauth_token.

   For example:

   https://www.your_server.com/auth/add_oauth_token

6. Move the following items from Available OAuth Scopes to Selected OAuth Scopes:
- Access and manage your data (api)
- Access your basic information (id)
- Perform requests on your behalf at any time (refresh_token)

7. Click **Save**.

After you save the app, Salesforce populates the API section with the following IDs that you will use to configure Tableau Server:

- Consumer Key
- Consumer Secret
- Callback URL

Configure Tableau Server for Salesforce.com OAuth

1. On the Tableau Server computer, open the Command Prompt as an administrator and change to the Tableau Server bin directory:

   ```cmd
   cd C:\Program Files\Tableau\Tableau Server\<version>\bin
   ```

2. Type the following command to stop the server:

   ```cmd
   tabadmin stop
   ```

3. Type the following commands to configure the server with the consumer ID and secret you obtained from Salesforce and the callback URL. Press **Enter** after each command:
tabadmin set oauth.salesforce.client_id <your_consumer_ID>

tabadmin set oauth.salesforce.client_secret <your_consumer_secret>

tabadmin set oauth.salesforce.redirect_uri <your_callback_URL>

4. (Optional) To change the default login server, type the following command:

   tabadmin set oauth.salesforce.server_base_url <URL>

   By default, this is set to https://login.salesforce.com.

5. Type the following commands to complete the configuration and restart the server:

   tabadmin config

   tabadmin start

Managing access tokens

After you configure the server for OAuth, you can allow users to manage their own access tokens in their profile settings, or you can manage the tokens centrally. For more information, see Allow Saved Access Tokens.

Set up OAuth for QuickBooks Online

This topic describes how to set up your QuickBooks Online data sources for OAuth authentication. Complete these steps for each Tableau Server instance.

**Note:** Before you complete these steps, make sure you have completed the prerequisites described in Preparing for Configuring OAuth Support.

Setting up OAuth for QuickBooks Online consists of two tasks:
Create a Connected App on the Intuit developer platform.

Use the information you get as part of the Connected App to configure your server.

Create a Connected Intuit App

1. Sign in to your Intuit developer account, and then click My Apps.

2. In the Just start coding section, click Select APIs.

3. Select Accounting and click Create App.

4. In the Get your app ready for submission section, click the link to get your production keys.

   **Important:** You must use production keys rather than development keys.

5. Copy the app token, OAuth consumer key, and OAuth consumer secret.

Configure Tableau Server for QuickBooks Online

1. On the Tableau Server computer, open a command prompt as an administrator and change to the Tableau Server bin directory using the following command:

   ```
   cd C:\Program Files\Tableau\Tableau Server\<version>\bin
   ```

2. Type the following command to stop the server:

   ```
   tabadmin stop
   ```

3. Type the following commands to configure the server with the app token, consumer key, and consumer secret that you copied from the Intuit site.

   ```
   tabadmin set oauth.quickbooks.oauth_callback_uri http://YOUR-SERVER/auth/add_oauth_token
   ```
tabadmin set oauth.quickbooks.consumer_key <your_consumer_key>

tabadmin set oauth.quickbooks.consumer_secret <your_consumer_secret>

4. Type the following commands to complete the configuration and restart the server:

    tabadmin config

    tabadmin start

Managing access tokens

If you run an extract refresh job for your QuickBooks Online data source, Tableau Server attempts to renew access tokens for you. To help ensure that your access tokens do not expire, run your extract refresh jobs more than once a month. Otherwise, the access tokens from QuickBooks Online expire and your extract refresh jobs fail. If your access tokens do expire, you can edit your saved credentials from the Settings page.

The saved credentials can be managed centrally or by your users. For more information, see Allow Saved Access Tokens.

Allow Saved Access Tokens

After you configure Tableau Server for OAuth, you can decide to allow users to manage their own OAuth credentials, or you want to manage them centrally. If you want users to manage their own, you need to enable user profile settings from the server.

**Note:** If you have not yet configured your server to enable OAuth data connections, see the related topics listed below.

1. Sign in to Tableau Server as a server administrator.

2. **Single-site:** Click Settings > General.
**Multisite**: In the site menu, click **Manage All Sites** and then click **Settings > General**.

3. In the **Saved Credentials** section, select the following:

   - **Allow users to save passwords for data sources** (allows users to save their individual credentials with data sources).
   - **Allow users to save OAuth access tokens for data sources**

4. Click **Save**.

After you select these check boxes, users will see a **Manage Credentials** section in their profile settings, where they can add access tokens for OAuth data connections.
Managing credentials centrally

Server administrators alternatively can manage OAuth credentials centrally. This can work well, for example, if multiple users work from the same data, and you have a dedicated user account for your data provider.

To manage credentials centrally, you do the following:

- Clear the check boxes described in the preceding procedure.
- Edit connection information as data sources are published.

  When you edit the connection, you embed credentials that use an OAuth access token instead of an individual’s user name and password.

When the settings for saving passwords and access tokens are not enabled, the Manage Credentials section is excluded from users’ profile settings.

See also

Set up OAuth for Google

Set up OAuth for Salesforce.com

Set up OAuth for QuickBooks Online

Authorization

Authorization refers to how and what users can access on Tableau Server after authentication has been verified. Authorization includes:

- What users are allowed to do with content hosted on Tableau Server, including projects, sites, workbooks, and views.
- What users are allowed to do with the data sources that are managed by Tableau Server.
- What tasks users are allowed to perform to administer Tableau Server, such as configuring server settings, running tabadmin, creating sites, and other tasks.
Authorization for these actions is managed by Tableau Server and determined by a combination of the user’s site role and permissions associated with specific entities such as workbooks and data sources.

Site Roles

Site roles are permission sets that are assigned to a user, such as System Administrator, Publisher, or Viewer. The site roles define collections of capabilities (delete, save, view, and others) that can be granted to users or groups on Tableau Server.

Site roles define who is an administrator. Administrators can be assigned at the site or server level. Site roles also determine whether non-admin users are allowed to publish to the server from Tableau Desktop. In general, site roles determine the maximum capabilities that can be granted for each non-admin user. For example, if a user’s site role is Interactor, the user cannot publish to the server, no matter what other permissions the user has, because the Interactor role denies permission to publish.

For more information about site roles, see Set Users’ Site Roles.

Permissions

Permissions determine whether a given user is allowed or denied to perform a specific action on a specific resource.

As an administrator setting up Tableau Server, it’s important that you understand how permissions are evaluated. Understanding the Tableau permissions process will enable you to set up and configure permissions on sites, projects, and other resources so that you can control how content and data is shared, published, viewed, extracted, and imported.

Four important concepts to understand about permissions in Tableau are:

- **Permissions are resource-based.** Permissions are assigned to individual resources and are granted to users or groups. Permissions are evaluated for projects, workbooks, views, and data sources.
- **Permissions are implicitly denied, and non-admin users must explicitly be allowed to access resources.** The process by which Tableau Server determines
the “allow” or “deny” permission is explained in detail in the topic, How Permissions are Evaluated.

- **Permissions inheritance exists only in locked projects and in workbooks with tabbed views.** When content permissions are locked to the project, its workbooks, views, and data sources will always use the default permissions in the project. In the case of workbooks saved with the option **Show sheets as tabs**, views will use the workbook permissions. For more information, see Content Access and Ownership.

- **In a project that is not locked, initial permissions are a one-time copy of the container item's permissions.** A workbook, view, or data source will start with the default permissions, but authorized users can subsequently edit permissions on those resources. For more information on default permissions and projects, see Set Default Permissions at the Project Level.

Tableau Server provides a flexible permissions infrastructure that allows you to manage access to all content for countless scenarios. See Content Access and Ownership for more detailed information.

**Data Access and External Authorization**

There are scenarios where Tableau Server and Desktop rely on external authorization to enable access to data. For example:

- Users connecting to external data sources may require authorization that is outside the scope of Tableau Server’s authority. If users publish an external data source, then Tableau Server will manage access and capabilities of data source. But if users embed an external data source in a workbook, then it’s up to the users who publishes the workbook to determine how other users who open the workbook will authenticate with the data source.

- Running Tableau Server in an organization with Active Directory where Tableau has been configured with a Run As user account results in a dependency on Active Directory and NTFS for authorization. For example, if you configure Tableau Server to use the Run As account to impersonate users connecting to SQL, then object-level authorization is reliant on NTFS and Active Directory.

- How users authenticate and are authorized by specific database solutions may differ. As noted, Tableau Server can be configured to provide access authorization when a
data source is configured, but some databases will authorize access according to their own authentication scheme.

Server Administration: Authorization for Configuring Tableau Server

One or more users must have Windows local admin permissions to configure Tableau Server and to run tabadmin set options commands.

Data Security

Tableau provides several ways for you to control which users can see which data. For data sources that connect to live databases, you can also control whether users are prompted to provide database credentials when they click a published view. The following three options work together to achieve different results:

- **Database login account:** When you create a data source that connects to a live database, you choose between authenticating to the database through Windows NT or through the database’s built-in security mechanism.

- **Authentication mode:** When you publish a data source or a workbook with a live database connection, you can choose an **Authentication mode**. Which modes are available depends on what you choose above.

- **User filters:** You can set filters in a workbook or data source that control which data a person sees in a published view, based on their Tableau Server login account.

The table below outlines some dependencies with the above options:
<table>
<thead>
<tr>
<th>Database Connection Options</th>
<th>Data Security Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database login account uses...</td>
<td>Authentication mode</td>
</tr>
<tr>
<td><strong>Window NT Integrated Security (Windows Authentication)</strong></td>
<td><strong>Server Run As account</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Impersonate via server Run As account</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Viewer Credentials</strong></td>
</tr>
<tr>
<td><strong>Username and Password</strong></td>
<td><strong>Prompt user</strong>: Viewers are prompted for their database credentials when they click a view. Credentials can be saved.</td>
</tr>
<tr>
<td></td>
<td><strong>Embedded credentials</strong>: The workbook or data source publisher can embed their database credentials.</td>
</tr>
<tr>
<td></td>
<td><strong>Impersonate via embedded password</strong>: Database</td>
</tr>
<tr>
<td><strong>Database Connection Options</strong></td>
<td><strong>Data Security Questions</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Database login account uses...</td>
<td>Authentication mode</td>
</tr>
<tr>
<td></td>
<td>Is database security possi-</td>
</tr>
<tr>
<td></td>
<td>ble per Tableau Server user?</td>
</tr>
<tr>
<td></td>
<td>Are user filters the only way</td>
</tr>
<tr>
<td></td>
<td>to restrict which data each</td>
</tr>
<tr>
<td></td>
<td>user sees?</td>
</tr>
<tr>
<td></td>
<td>Are web caches shared among users?</td>
</tr>
</tbody>
</table>
| credentials with impersonate per-
| mission are embedded.          |                            |

* Because it can create unexpected results, Tableau recommends that you not use this authentication mode with user filters.

User filters, the embedded credentials option and the impersonation modes have similar effects—when users click a view, they are not prompted for database credentials and they see only the data that pertains to them. However, user filters are applied in the workbook by authors, and the impersonation authentication modes rely on security policies defined by administrators in the database itself.

Some of the options described above require configuration steps that must happen during Tableau Server Setup or before you publish a workbook or data source. See the following topics for more information:

- Server Settings (General)
- Enable Kerberos Delegation
- OAuth Connections
- Run As User
• SQL Server Impersonation

• User Filters and Data Source Filters in the Tableau Desktop Help.

Related Topics

Regenerate a Password for the Tableau Server PostgreSQL Database (Repository)

Manage Server Secrets

Regenerate a Password for the Tableau Server PostgreSQL Database (Repository)

When you install Tableau Server or upgrade from a previous version, the installation process generates a password for Tableau Server to use internally when it accesses the Repository PostgreSQL database. To help with security, the password generated during the installation process is unique to an installation. Because the password is used only by Tableau Server for access to the Repository, the password is not accessible to server administrators or other users.

Tableau Server can also generate an SSL certificate that can be used to protect internal communications to the Repository and other server components. Using SSL for internal communications between processes is optional. For more information, see Configure Internal SSL.

Note: If you need access to the Repository (for example, to monitor activity), you can use the administrative views that are built in to the server environment or create your own custom views. For more information, see Collect Data with the Tableau Server Repository for details.

Regenerating the password and certificate

If you need to generate a new password and certificate for internal use, you can use the `tabadmin regenerate_internal_tokens` command. For example, if you believe
your installation of Tableau Server has been compromised, you should run the regenerate_internal_tokens command to generate a new password and SSL certificate.

**Note:** The SSL certificate is used for internal communication between server components and the PostgreSQL database and is independent of any SSL certificate that you might have on the server to use for HTTPS communication between the server and clients that connect to Tableau Server.

To manually regenerate a password and SSL certificate:

1. On the Tableau Server computer, open a command prompt as an administrator and navigate to `<install directory>\Program Files\Tableau\Tableau Server\9.0\bin`.

2. Enter the following:
   ```
   tabadmin stop
   tabadmin regenerate_internal_tokens
   tabadmin config
   tabadmin start
   ```

   See regenerate_internal_tokens for more information, including optional switches to specify regeneration of password or certificate.

**Manage Server Secrets**

Tableau Server needs to store a number of secrets it uses to perform various functions, typically securing internal communication, communicating with other applications or the operating system, or providing secure communication with clients. In this context, the term *secret* may refer to a password, a token, or other string that is used to authenticate one entity to another.

There are two categories of secrets that are required to run Tableau Server. They differ according to how the secrets are generated:
• **Secrets that are generated by administrators.** These include credentials and associated secrets for the Run As User account and the SMTP credentials used by Tableau Server.

• **Secrets that are automatically generated by various processes in the system.** For example, a secret is required to protect communication between the Cluster Controller and ZooKeeper processes. And a number of different passwords are required for each service and programmatic user that communicates with Postgres.

Beginning with Tableau Server 10.2, most secrets are encrypted while at rest. When a secret is needed, it is decrypted at run time.

This topic describes how secrets storage works and what you need to do to properly manage storage of secrets on Tableau Server.

Understanding how secrets storage works

During installation Tableau Server generates and stores a master key in a Java keystore. The master key is used to encrypt a configuration encryption key that is used across the system.

Whenever a new secret is created or updated, the secret is encrypted with the configuration encryption key. The encrypted value is then stored with its corresponding configuration parameter in a YAML file on the server. Parameters that hold an encrypted value use the format, ENC(<encrypted string>), where <encrypted string> is a Base64-encoded encrypted string.

At run time, when a given secret needs to be accessed, the encrypted values are read into memory and decrypted with the configuration encryption key.

Tableau Server encrypts secrets using 256-bit AES in GCM mode. The keys used for secure storage are different than the asset keys that are used to encrypt embedded database credentials before they are stored in the repository. See assetkeys for more information.
Who has access to the master key?

In a default installation, the Java key store for Tableau Server is installed in \ProgramData\Tableau\Tableau Server\config\tabsvc\keystores\ folder. If you have installed Tableau on a non-system drive, then the path is <install drive>:\Tableau\Tableau Server\config\tabsvc\keystores\. By default, the following accounts have access to this directory:

- Run As User account (if configured)
- NetworkService predefined local Windows account
- LocalSystem predefined local Windows account
- Members of the computer Administrators group

Back up and restore

When you back up Tableau Server using the tabadmin backup command, all secrets, keys, and configuration data are written to a secrets storage configuration bundle in the backup file. Since the backup file stores sensitive data, you should store the file in a secure location. You can also set the backup process with the --no-config option. With the --no-config option set, only content is backed up. All of the configuration data, which includes the secrets storage configuration bundle, is not included in the backup file. See tabadmin backup for more information.

When you run restore from a back up file that does not include configuration data, then the restore process will use the existing configuration data on the server where you are running restore. Alternatively, if you restore from a backup that includes the configuration data, then the restore process will use keys and encrypted configuration data from the backup.

You can also run the restore process with the --no-config option on the tabadmin restore command. In this case, any configuration data in the back up file is ignored and the restore process will use the existing configuration data on the server where you are running restore.
Worker cluster nodes

Adding cluster nodes is handled by a similar process as backup. During the cluster node provisioning process, Tableau Server copies the configuration bundle including encryption keys to each node. Tableau Server distributes the bundle to new cluster nodes.

Upgrade behavior

The Tableau Server Setup program has been updated to handle secure storage.

Upgrade behavior depends upon the version of Tableau Server you are currently running:

- Versions after 10.2: During the upgrade process from a version of Tableau Server where secure storage is already configured, Setup will not make changes to the secure storage configuration.
- Versions prior to 10.2: If you are upgrading from a version of Tableau Server that does not support the implementation of secrets, then upgrade will behave as a normal installation. This means that Setup will generate the master and configuration encryption keys and then encrypt the existing secret values that are stored in the configuration files. In a distributed installation, Setup will then distribute the secrets storage configuration bundle to the nodes in the cluster.

Secrets storage event logging

The following events related to secrets storage are logged in tabadmin.log:

- Generating new encryption keys
- Encryption key is rolled or changed
- Encrypting a new value in the configuration file

For more information about log files and where they are stored, see Server Log File Locations.

Managing secrets

As a Tableau Server administrator the most important task related to secrets storage is to periodically update secrets. In some cases (server troubleshooting or auditing), you may need to retrieve a password.
For other operations, such as upgrading versions, backing up and restoring, or adding new nodes to a cluster—as noted above—Tableau Server manages secrets storage and related processes automatically.

Updating secrets

You should update secrets periodically, according to your company’s security policy.

As noted in the introduction, the first category of secrets (Run As User and SMTP credentials used by Tableau Server), are those that are generated by server administrators. When you update these passwords with the Tableau Server Configuration Utility, the stored secrets will be automatically encrypted and stored.

The second category of secrets are those that are generated automatically by the various server processes. These secrets are created during installation.

To update automatically generated secrets, run the `tabadmin regenerate_internal_tokens` command using the `--roll_key` option. Running this command updates the secrets for each process pair on the server. For the list of secrets and process pairs see the table below in the following section.

Retrieving passwords

In some cases, you may need to retrieve a password for troubleshooting or other operations. For example, you may need the Postgres readonly user credentials that are generated and encrypted by Tableau Server. In these cases, you can run a `tabadmin` command that will retrieve and decrypt the password for you.

The account you are using to run the `tabadmin` command must be a member of the Administrators group.

To retrieve a password, open Command Prompt and issue a `tabadmin get` command for one of the parameters listed in the table below.

For example, to retrieve a password for the readonly Postgres user, type the following command:
tabadmin get pgsql.readonly_password

The command will return the password in clear text:

$ tabadmin get pgsql.readonly_password

password

<table>
<thead>
<tr>
<th>Configuration Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clustercontroller.zookeeper.password</td>
<td>Password for cluster controller to connect to zookeeper.</td>
</tr>
<tr>
<td>filestore.zookeeper.password</td>
<td>Password for filestore to connect to zookeeper.</td>
</tr>
<tr>
<td>jdbc.password</td>
<td>Password for the rails Postgres user.</td>
</tr>
<tr>
<td>oauth.google.client_secret</td>
<td>Client secret of the Google Cloud Platform account. See Set up OAuth for Google.</td>
</tr>
<tr>
<td>oauth.quickbooks.consumer_secret</td>
<td>Consumer secret of the Intuit developer account. See Set up OAuth for QuickBooks Online.</td>
</tr>
<tr>
<td>pgsql.adminpassword</td>
<td>Password for the tblwgadmin Postgres user.</td>
</tr>
</tbody>
</table>

**Note:** Although the configuration parameter is encrypted in Tableau's configuration files (tabsvc.yml, workgroup.yml), in some scenarios, this password will be stored in plain text.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>pgsql.readonly_password</code></td>
<td>Password for the readonly Postgres user.</td>
</tr>
<tr>
<td><code>pgsql.remote_password</code></td>
<td>Password for the tableau Postgres user.</td>
</tr>
<tr>
<td><code>redis.password</code></td>
<td>Password for Redis.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Although the configuration parameter is encrypted in Tableau's configuration files, the configuration will still be in plain text in the redis.conf file that is consumed by the Redis application. Redis does not support encrypted/secured passwords.</td>
</tr>
<tr>
<td><code>servercrashupload.proxy_server_password</code></td>
<td>Password for custom proxy server used to upload crash reports.</td>
</tr>
<tr>
<td><code>service.runas.password</code></td>
<td>Password of the Run As users. Stored temporarily.</td>
</tr>
<tr>
<td><code>ssl.key.passphrase</code></td>
<td>Optional passphrase used to protect the Apache SSL key.</td>
</tr>
<tr>
<td><code>svcmonitor.notification.smtp.password</code></td>
<td>SMTP Server password supplied by the administrator through TabConfig.exe.</td>
</tr>
<tr>
<td><code>tabadminservice.password</code></td>
<td>Password for the service that allows server admins to download log files through the web interface.</td>
</tr>
<tr>
<td>Environment Variable</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>vizportal.openid.client_secret</td>
<td>This is the password (&quot;provider client secret&quot;) used for OpenID Connect SSO. See Configure Tableau Server for OpenID Connect.</td>
</tr>
<tr>
<td>vizportal.servicepassword</td>
<td>Password for the Tableau Application Server service (vizportal.exe). Other services use this password to authenticate requests from the Application Server service.</td>
</tr>
<tr>
<td>vizqlsrver.external_proxy_password</td>
<td>Password used to authenticate to an external proxy.</td>
</tr>
<tr>
<td>vizqlsrver.extsvc.password</td>
<td>Password for the service that supports R functionality in workbooks.</td>
</tr>
<tr>
<td>wgserver.domain.password</td>
<td>Password used to bind to Active Directory.</td>
</tr>
</tbody>
</table>

**Network Security**

There are three main network interfaces in Tableau Server:

- **Client to Tableau Server**: The client can be a web browser, Tableau Mobile, Tableau Desktop, or the tabcmd utility.

- **Tableau Server to your database(s)**: To refresh data extracts or handle live database connections, Tableau Server needs to communicate with your database(s).

- **Server component communication**: This applies to distributed deployments only.

**Client to Tableau Server**

A Tableau Server client can be a web browser, a device running Tableau Mobile, Tableau Desktop, or tabcmd commands. Communications between Tableau Server and its clients use standard HTTP requests and responses. We recommend configuring Tableau Server for HTTPS for all communications. When Tableau Server is configured for SSL, all content
and communications between clients are encrypted using SSL, and the HTTPS protocol is used for requests and responses.

By default, passwords are communicated from browsers and tabcmd to Tableau Server using 1024-bit public/private key encryption. This level of encryption is not considered robust enough for secure communications. Additionally, this method, where a public key is sent to the recipient in the clear and without network layer authentication is susceptible to man-in-the-middle attacks.

To adequately secure network traffic from clients to Tableau Server, you must configure SSL with a certificate from a trusted certificate authority. See Configure External SSL.

Client access from the Internet

We recommend a gateway proxy server to enable secure client access from the internet to your Tableau Server. We do not recommend running Tableau Server in a DMZ or otherwise outside your protected, internal network.

Configure a reverse proxy server, with SSL enabled, to handle all inbound traffic from the internet. In this scenario, the reverse proxy is the only external IP address (or range of addresses if multiple reverse proxies are load-balancing inbound requests) that Tableau Server will communicate with. Reverse proxies are transparent to requesting clients, thereby obfuscating Tableau Server network information and simplifying client configuration. For configuration information, see Configuring Proxies for Tableau Server.

Clickjack Protection

By default, Tableau Server has clickjack protection enabled. This helps prevent certain types of attacks in which the attacker overlays a transparent version of a page on top of an innocuous-looking page in order to lure a user into clicking links or entering information. With clickjack protection enabled, Tableau Server imposes certain restrictions on embedding views. For more information, see Clickjack Protection.
Tableau Server to your database

Tableau Server makes dynamic connections to databases to process result sets and refresh extracts. It uses native drivers to connect to databases whenever possible and relies on a generic ODBC adapter when native drivers are unavailable. All communications to the database are routed through these drivers. As such, configuring the driver to communicate on non-standard ports or provide transport encryption is part of the native driver installation. This type of configuration is transparent to Tableau.

When a user stores credentials for external data sources on Tableau Server, they are stored encrypted in Tableau Server's internal database. When a process uses those credentials to query the external data source, the process retrieves the encrypted credentials from the internal database and decrypts them in process.

Tableau Server to the Internet

In some cases, where users connect to external data sources, such as the Tableau map servers, then Tableau Server will need to connect to the internet. We recommend that you run all components of Tableau inside your protected network. Therefore, connections to the internet may require that you configure Tableau Server to use a forward proxy. See the Knowledge Base article, Configuring Proxies for Tableau Server, for more information.

Communication with the repository

You can configure Tableau Server to use Secure Sockets Layer (SSL) for encrypted communications on all traffic that is exchange with the Postgres repository to and from other server components. By default, SSL is disabled for communications between server components and the repository. For more information, see Configure Internal SSL.

Server component communication in a cluster

There are two aspects to communication between Tableau Server components in a distributed server installation: trust and transmission. Each server in a Tableau cluster uses a stringent trust model to ensure that it is receiving valid requests from other servers in the cluster. Computers in the cluster running a gateway process accept requests from third
parties (clients), unless they are fronted by a load balancer, in which case the load balancer receives the requests. Servers not running a gateway process only accept requests from other trusted members of the cluster. Trust is established by a whitelist of IP address, port, and protocol. If any of these are invalid, the request is ignored. All members of the cluster can communicate with each other.

When a user stores credentials for external data sources on Tableau Server, they are stored encrypted in Tableau Server’s internal database. When a process uses those credentials to query the external data source, the process retrieves the encrypted credentials from the internal database and decrypts them in process.

Clickjack Protection

Tableau Server includes protection against clickjack attacks. Clickjacking is a type of attack against web pages in which the attacker tries to lure users into clicking or entering content by displaying the page to attack in a transparent layer over an unrelated page. In the context of Tableau Server, an attacker might try to use a clickjack attack to capture user credentials or to get an authenticated user to change settings on your server. For more information about clickjack attacks, see Clickjacking on the Open Web Application Security Project website.

**Note:** Clickjack protection was available in previous versions of Tableau Server, but was disabled by default. New installations of Tableau Server 9.1 and later will always have clickjack protection on unless you explicitly disable it.

Effects of clickjack protection

When clickjack protection is enabled on Tableau Server, the behavior of pages loaded from Tableau Server changes in the following ways:

- **Tableau Server adds the X-Frame-Options: SAMEORIGIN header to certain responses from the server.** In the current versions of most browsers, this header prevents the content from being loaded into an `<iframe>` element, which helps prevent
clickjacking attacks.

- The top-level page from Tableau Server cannot be loaded in `<iframe>` elements. This includes the sign-in page. One consequence is that you cannot host Tableau Server pages in an application that you create.

- Only views can be embedded.

- If an embedded view requires data source credentials, a message is displayed in the `<iframe>` element with a link to open the view in a secure window where the user can safely enter credentials. Users should always verify the address of the opened window before entering credentials.

- Views can be loaded only if they include the `:embed=y` parameter in the query string, as in this example:

```
http://<server>/views/Sales/CommissionModel?:embed=y
```

**Note:** When clickjack protection is enabled, embedded views that use the URL copied from the browser address bar might not load. These view URLs usually contain the hash symbol (#) after the server name (for example, `http://myserver/#/views/Sales/CommissionModel?:embed=y`) are blocked when clickjack protection is enabled on Tableau Server.

Disabling clickjack protection

You should leave clickjack protection enabled unless it is affecting how your users work with Tableau Server. If you want to disable clickjack protection, use the following `tabadmin` commands:

1. `tabadmin stop`

2. `tabadmin set wgserver.clickjack_defense.enabled false`
SSL

SSL (Secure Sockets Layer) is a standard security technology that establishes an encrypted link between a web server and clients. To use SSL, you need to install an SSL certificate on Tableau Server.

Tableau Server also supports mutual (two-way) SSL as an encryption and authentication method.

You can configure Tableau Server to use SSL in the following ways:

- Use SSL for external HTTP traffic.
- Use mutual (two-way) SSL between clients (Tableau Desktop, web browsers, and tabcmd.exe) and Tableau Server.
- Use SSL for all HTTP traffic between internal server components and the repository.

If you are using mutual SSL, each client also needs a certificate.

**Note:** Tableau Server uses SSL only for user authentication. Tableau Server does not use SSL to handle permissions and authorization for content hosted on Tableau Server, such as workbooks.

Quick Start: Mutual (Two-Way) SSL Authentication

To provide a secure automatic sign-in experience with Tableau across all devices, use mutual SSL. With mutual SSL, when a client (Tableau Desktop on Windows or a web browser) with a valid certificate connects to Tableau Server, Tableau Server confirms the existence of a valid client certificate and automatically signs the user in, using the user name it finds in the certificate. If the client does not have a valid SSL certificate, Tableau Server
refuses the connection. To configure Tableau Server for mutual SSL, you need the following:

- **SSL certificate file**—A valid PEM-encoded x509 certificate with the extension .crt.
- **SSL certificate key file**—A valid RSA or DSA private key file (with the extension .key by convention).
- **SSL certificate chain file (Optional for Tableau Server, required for Tableau Mobile and Tableau Desktop on the Mac)**—Some certificate providers issue two certificates for Apache. The second certificate is a chain file, which is a concatenation of all the certificates that form the certificate chain for the server certificate. All certificates in the file must be x509 PEM-encoded and the file must have a .crt extension (not .pem).

The certificate files should be in the C:\Program Files\Tableau\Tableau Server-\SSL folder.

1 Use SSL for server communication

To configure Tableau Server to use SSL for external communication between Tableau Server and web clients, run the Tableau Server Configuration utility after you have installed Tableau Server. Click the **SSL** tab, and then select **Use SSL for server communication**.
Specify values for **SSL certificate file** and **SSL certificate key file**.

If the certificate key file requires a passphrase enter it in the field, **SSL certificate key passphrase**. (The passphrase you enter will be encrypted while at rest). Alternatively, you can provide a path to a key file that is not passphrase protected.

2 Use mutual SSL

To add mutual authentication between the server and each client and allow for automatic sign-in experience, select **Use mutual SSL and automatic login with client certificates**.

![Tableau Server Configuration](image)

Specify the **SSL CA certificate file**. The SSL CA certificate file identifies the certificate of the Certificate Authority (for example, Verisign). For information on how to configure multiple Certificate Authorities, see Configure External SSL.

Click OK to close the Tableau Server Configuration utility, and then start Tableau Server.
Additional options for mutual SSL

**Fallback authentication**

When Tableau Server is configured for mutual SSL, authentication is automatic and a client must have a valid certificate. If you need a fallback option, use the `tabadmin set ssl.client_certificate_login.fallback_to_password true` command to configure Tableau Server to allow user name / password authentication. Setting this option to `true` allows Tableau Server to fall back to using user name and password for authentication if SSL certificate authentication fails.

**Username mapping**

When Tableau Server is configured for mutual SSL, the server gets the user name from the client certificate so the client can be automatically signed in. The name that Tableau Server uses depends on how Tableau Server is configured for user authentication:

- **Local Authentication**—Tableau Server uses the UPN (User Principal Name) from the certificate.
- **Active Directory (AD)**—Tableau Server uses LDAP (Lightweight Directory Access Protocol) to get the user name.

You can override either of these defaults to set Tableau Server to use the CN (Common Name) by using the `tabadmin set ssl.client_certificate_login.mapping_strategy` command.

**Certificate Revocation List (CRL)**

You may need to specify a CRL if you suspect that a private key has been compromised, or if a certificate authority (CA) did not issue a certificate properly. To specify a CRL, use the `tabadmin set ssl.revocation.file` command. For more information, see `tabadmin set Commands`. 

.
Configure External SSL

You can configure Tableau Server to use Secure Sockets Layer (SSL) encrypted communications on all external HTTP traffic. Setting up SSL ensures that access to Tableau Server is secure and that sensitive information passed between the web browser and the server or Tableau Desktop and the server is protected. Steps on how to configure the server for SSL are described in the topic below; however, you must first acquire a certificate from a trusted authority, and then import the certificate files into Tableau Server. If you are running a Tableau Server cluster and you want to use SSL, see Configure SSL for a Cluster, below, for recommendations.

1. Acquire an Apache SSL certificate from a trusted authority (for example, Verisign, Thawte, Comodo, GoDaddy). You can also use an internal certificate issued by your company. Wildcard certificates, which allow you to use SSL with many host names within the same domain, are also supported.

   **Note:** Be sure to use a SHA-2 (256 or 512 bit) certificate. All major browsers will display warnings when connecting to SHA-1 certificates. By the end of 2017, it’s likely that most browsers will no longer connect to servers that are presenting SHA-1 certificates.

Some browsers will require additional configuration to accept certificates from certain providers. Refer to the documentation provided by your certificate authority.

2. Place the certificate files in a folder named SSL, parallel to the Tableau Server 10.2 folder. For example:

   C:\Program Files\Tableau\Tableau Server\SSL

   This location gives the account that’s running Tableau Server the necessary permissions for the files. You may need to create this folder.

3. Open the Tableau Server Configuration Utility by selecting **Start > All Programs >**
4. In the Configuration Tableau Server dialog box, select the **SSL** tab.

5. Select **Use SSL for server communication** and provide the location for each of the following certificate files:

   - **SSL certificate file**—Must be a valid PEM-encoded x509 certificate with the extension .crt.
   - **SSL certificate key file**—Must be a valid RSA or DSA private key file (with the extension .key by convention). If the certificate key file requires a passphrase, enter it in the field, **SSL certificate key passphrase**. (The passphrase you enter will be encrypted while at rest). Alternatively, you can provide a path to a key file that is not passphrase protected.

   **Note:** If you create a certificate key file with a passphrase, you cannot reuse the SSL certificate key for SAML.

   - **SSL certificate chain file** (Optional for Tableau Server, required for Tableau Mobile and Tableau Desktop on the Mac)—Some certificate
providers issue two certificates for Apache. The second certificate is a chain file, which is a concatenation of all the certificates that form the certificate chain for the server certificate. All certificates in the file must be x509 PEM-encoded and the file must have a .crt extension (not .pem).

6. (optional) If you are using SSL for server communication and want to configure SSL communication between Tableau Server and clients using certificates on both the server and clients:

   • Select **Use mutual SSL and automatic login with client certificates.**

   **Note:** Tableau Server does not support mutual SSL and SAML together.

   • In **SSL CA certificate file**, browse to the location for the certificate file. The SSL CA certificate file must be a valid PEM-encoded x509 certificate with the extension .crt.

   **Note:** If you have multiple trusted Certificate Authorities (CAs) you can copy and paste the entire contents of each CA certificate, including the "BEGIN CERTIFICATE" and "END CERTIFICATE" lines, into a new file, then save the file as CAs.crt. In **SSL CA certificate file**, browse to the location of this new file.

7. Click **OK**. The changes will take effect the next time the server is restarted.

When the server is configured for SSL, it accepts requests to the non-SSL port (default is port 80) and automatically redirects to the SSL port 443.

**Note:** Tableau Server only supports port 443 as the secure port. It cannot run on a computer where another application is using port 443.
SSL errors are logged in the install directory at the following location. Use this log to troubleshoot validation and encryption issues:

C:\ProgramData\Tableau\Tableau Server-\data\tabsvc\logs\httpd\error.log

Configure SSL for a Cluster

You can configure a Tableau Server cluster to use SSL. If the primary Tableau Server computer is the only node that is running the gateway process (which it does by default), then that's the only place where you need to configure SSL. See the procedure above for steps.

SSL and Multiple Gateways

A highly available Tableau Server cluster can include multiple gateways, fronted by a load balancer (learn more). If you are configuring this type of cluster for SSL, you have two choices:

- **Configure your load balancer for SSL.** Traffic is encrypted from the client web browsers to the load balancer. Traffic from the load balancer to the Tableau Server gateway processes is not encrypted. No SSL configuration in Tableau Server is required, it's all handled by your load balancer.

- **Configure Tableau Server for SSL:** Traffic is encrypted from the client web browsers to the load balancer, and from the load balancer to the Tableau Server-gateway processes. See the procedure below for details.

Configure a Server Cluster for SSL

When you configure a Tableau Server cluster to use SSL, you place the SSL certificate and key files on every computer that’s running a gateway process. To configure a Tableau Server cluster to use SSL:

1. Configure the external load balancer for SSL passthrough. Or if you want to use a port other than 443, you can configure the external load balancer to terminate the non-
standard port from the client. In this scenario, you would then configure the load balancer to connect to Tableau Server over port 443. Refer to your load balancer’s documentation for assistance.

2. Make sure that the SSL certificate you use was issued for the load balancer’s host name.

3. Configure the primary Tableau Server node as described in the procedure above.

4. Place the same SSL certificate and key file that you used for the primary on each Tableau Server worker node that is running a gateway process. Use the same folder location on the workers that you used on the primary.

   If you are using mutual ssl, place the SSL CA certificate file you used for the primary on each worker node that is running a gateway process. Use the same folder location that you used on the primary.

   You do not need to do any additional configuration on the workers.

   For example, say you have a cluster that includes a primary Tableau Server node and three worker nodes with gateway processes are running on the primary, Worker 2 and Worker 3. In this situation, you configure the primary Tableau Server for SSL, then copy the same SSL certificate and key files to Worker 2 and Worker 3. Because these files are in the C:\Program Files\Tableau\Tableau Server\SSL folder on the primary, they are in that same location on Worker 2 and Worker 3.

You can configure a Tableau Server cluster to use SSL. If the primary Tableau Server computer is the only node that is running the gateway process (which it does by default), then that's the only place where you need to configure SSL. See the procedure above for steps.

Configure Internal SSL

You can configure Tableau Server to use Secure Sockets Layer (SSL) for encrypted communications on all traffic between the Postgres repository and other server components. By default, SSL is disabled for communications between server components and the repository.
1. Open the Tableau Server Configuration Utility by selecting **Start > All Programs > Tableau Server 10.2 > Configure Tableau Server**.

2. In the Tableau Server Configuration dialog box, click the **SSL** tab.

3. Select one of the following options:

   - **Required for all connections**
     
     When this option is selected, Tableau Server uses SSL for communications between the repository database and other server components. In addition, direct connections to Tableau Server (connections using the "tableau" or "readonly" users) must use SSL.

   - **Optional for direct user connections**
     
     This option configures Tableau Server to use SSL between the repository and other server components and supports but does not require SSL for direct connections by "tableau" or "readonly" users.

   - **Off for all connections** (the default)
     
     This option disables SSL for internal communications and direct connections.

4. Click **OK**.

For more information on downloading the public certificate for direct connections, see **Configure SSL for Direct Connections**.

**Configure SSL for Direct Connections**

When Tableau Server is configured to use SSL internally, SSL connections are either optional or required for client machines making direct connections to the Tableau Server repository database. Direct connections include those using the "tableau" user or the "readonly" user.

To use SSL with direct connections, generate the SSL certificate file and copy it to the computer from which you will be making the direct connections.
1. Generate the SSL certificate file using the regenerate_internal_tokens command.

2. Locate the SSL cert file by looking in the workgroup.yml file on the primary Tableau Server node.

   The workgroup.yml file is located on the primary Tableau Server node in the \ProgramData\Tableau\Tableau Server\data\tabsvc\config folder.

   The location of the SSL certificate and key files are listed in the file. For example:

   `pgsql.ssl.cert.file: C:/ProgramData/Tableau/Tableau Server-\data\tabsvc\config\pgsql\server.crt`

   `pgsql.ssl.key.file: C:/ProgramData/Tableau/Tableau Server-\data\tabsvc\config\pgsql\server.key`

3. Copy the cert file to the computer that will be making the direct connection and import them into the computer’s certificate store using the documentation from the operating system manufacturer.

   **Note:** Do not copy the key file. This file should only be on the server.

How Mutual SSL Authentication Works

Mutual (or two-way) SSL authentication provides a combination of an encrypted data stream, mutual authentication of both server and client, and automatic sign-in convenience. To use mutual SSL with Tableau Server, you need an SSL certificate for Tableau Server and a certificate on each client that will connect to Tableau Server. You also need to configure Tableau Server to use mutual SSL. Tableau Server and client verify that each other has a valid certificate, and Tableau Server signs in the user automatically, based on the user name that Tableau Server finds in the client certificate.

The following image shows the sequence of events that occurs with mutual SSL.
The user navigates to Tableau Server.

Tableau Server sends its SSL certificate to the client computer.

The client computer verifies the Tableau Server certificate.

The client computer sends its certificate to Tableau Server.

Tableau Server verifies the client certificate.

Tableau Server signs the user in using the user name from the certificate.

Mapping a Client Certificate to a User During Mutual Authentication

When you use mutual (two-way) SSL authentication, the client presents its certificate to Tableau Server as part of the authentication process. Tableau Server then maps user information in the client certificate to a known user identity. Tableau Server can perform client mapping using different strategies, depending on the content of the client certificates in your organization.
This topic discusses the options for how a client certificate is mapped to a user identity and explains how to change how the server performs the mapping if necessary. Note that in order for you to understand how the mapping is performed and whether you need to change the default mapping for Tableau Server, you must understand how client certificates are structured in your organization.

- Mapping options
- Changing the certificate mapping
- Ambiguous user names in multi-domain organizations

Mapping options

Tableau Server can map a client certificate to a user identity by using one of the following approaches:

- **Use Active Directory.** If Tableau Server was configured during setup to use Active Directory for user authentication, when Tableau Server receives a client certificate, Tableau Server passes the certificate to Active Directory, which maps the certificate to an Active Directory identity. Any explicit user name information in the certificate is ignored.

  **Note:** This approach requires client certificates to be published for the user accounts in Active Directory.

- **Using the user principal name (UPN).** A client certificate can also be created so that the user name is in the user principal name (UPN) field of the certificate. Tableau Server can read the UPN value and use it to map to a user in Active Directory or to a local user.

- **Using the common name (CN).** A client certificates can also be created so that the
user name is in the common name (CN) field of the certificate. Tableau Server can read the CN value and use it to map to a user in Active Directory or to a local user.

If the server is configured for Active Directory authentication, and if you're using UPN or CN mapping, the user name should be in one of these formats: `username, domain\username, or username@domain`. For example, the name must be `asmith, example.org\asmith`, or `asmith@example.org`.

If the server uses local authentication, the format of the name in the UPN or CN fields is not predetermined, but the name in the field must match a user name on the server.

**Changing the certificate mapping**

The approach that Tableau Server uses to map a client certificate to a user identity is specified using the `ssl.client_certificate_login.mapping_strategy` setting. Possible values for this setting are `ldap` for Active Directory mapping, `upn` for UPN mapping, or `cn` for CN mapping.

When you first install and configure Tableau Server, the server makes default settings for the mappings. By default, if Tableau Server is configured to use Active Directory, the server also uses Active Directory for mapping the certificate to the user identity (`ssl.client_certificate_login.mapping_strategy` is set to `ldap`). If the server is configured to use local authentication, by default the server gets the user name value from the UPN field in the certificate (`ssl.client_certificate_login.mapping_strategy` is set to `upn`).

If the default behavior for how Tableau Server maps a user name to an identity is not correct for your server configuration, run the `tabadmin set` command to change the value of `ssl.client_certificate_login.mapping_strategy`. As an example, the following sequence of commands shows how to set the mapping to use the CN value:

```
tabadmin stop
tabadmin set ssl.client_certificate_login.mapping_strategy cn
```
Ambiguous user names in multi-domain organizations

Under some circumstances, the user name in a UPN or CN field in the certificate can be ambiguous. This can have unexpected results when the user name is mapped to a user identity on the server. This can occur when all of the following conditions apply:

- Your organization supports multiple Active Directory domains.
- The server is configured to use Active Directory authentication.
- The server is configured to use UPN or CN mapping.
- Some users have the same user name but different domains (for example, asmith@example.org and asmith@example.com).
- The user name in the UPN or CN fields of the certificate does not include the domain as part of the user name—for example, the certificate simply includes asmith.

If Tableau Server gets a user name that has no domain, the server maps the user name to an identity using the default domain. This can result in incorrectly mapping the user name.

**Important:** Incorrect mapping of the user name can result in a user being granted an identity and permissions for a different user. To avoid this issue, you should make sure that the client certificates include full user names, with the domain.

To resolve this issue, the system administrator should make sure that the user name in the user’s certificate is fully qualified with a domain name using the format asmith@example.org or example.org\asmith.
Troubleshooting Mutual SSL Authentication

This topic describes possible mutual (two-way) SSL authentication issues and their causes, the messages that users might see, and possible mitigation for the issues.

- The client is missing a certificate
- The client doesn't support mutual SSL authentication
- Client certificates are not published to Active Directory
- Users unexpectedly see a sign-in dialog box that displays an error message
- The user name in the UPN or CN fields is missing or invalid
- The user is signed in using unexpected user name (LDAP mapping)
- The user is signed in as incorrect user (UPN or CN mapping)

For more information about mutual SSL authentication and LDAP, UPN, and CN user mapping, see the following topics:

- Quick Start: Mutual (Two-Way) SSL Authentication
- Mapping a Client Certificate to a User During Mutual Authentication

We couldn't find a valid client certificate.
Contact your Tableau Server administrator.

The client is missing a certificate.
If the client has no client certificate, the user sees this message during authentication:

We couldn't find a valid client certificate. Contact your Tableau Server administrator.

To resolve the issue, the user should contact the system administrator to generate a certificate for the client computer.
Invalid user name or password

The client doesn't support mutual SSL authentication.

Versions of Tableau Desktop older than version 9.1 do not support mutual SSL authentication. If an older version of Tableau Desktop is used to connect to Tableau Server that is configured for mutual SSL authentication, the following can occur:

- If Tableau Server is configured to use fallback authentication, the client displays a sign-in dialog box and the user can enter a user name and password.
- If the server is not configured to use fallback authentication, the user sees the following message and cannot connect to the server:

  Invalid user name or password

For more information about fallback authentication, see Quick Start: Mutual (Two-Way) SSL Authentication.

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator or sign in using your Tableau Server account.

Client certificates are not published to Active Directory.

If Tableau Server is configured to use Active Directory for authentication, and if user mapping is set to LDAP, Tableau Server sends the client certificate to Active Directory for authentication. However, if client certificates have not been published to Active Directory, authentication fails and the user sees the following message:
We couldn't find your user name in the client certificate. Contact your Tableau Server administrator or sign in using your Tableau Server account.

To resolve this issue, the system administrator should make sure that client certificates are published to Active Directory. Alternatively, the server should be configured to use a different user mapping (UPN or CN), and the system administrator should be sure that client certificates contain user names in the UPN or CN fields.

**Users unexpectedly see a sign-in dialog box that displays an error message**

If Tableau Server is configured to use mutual SSL authentication and certificates are available for use with users' computers, a user should not see a sign-in dialog box, because Tableau Server uses the certificate to authenticate the user. However, if the server does not recognize the user name in the certificate, the user sees a sign-in dialog box with an error message that indicates why the certificate was not used. This can occur when all of the following conditions are true:

- Fallback authentication is enabled.
- If the server is using UPN or CN mapping, the user name in the certificate's UPN or CN field is not recognized. If the server is using LDAP mapping, the certificate is not mapped to the user in Active Directory.

To resolve this issue, the system administrator should do the following, depending on how user mapping is configured on Tableau Server:

- LDAP mapping: Make sure that the certificate is linked to the user, that the certificate is available for use with the user's computer, and that the user is configured as a Tableau Server user.
- UPN or CN mapping: Make sure that the certificate is available for the user's
computer, that the user name is in the certificate's UPN or CN field, and that the user name matches the user name on Tableau Server (including domain).

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator.

Certificate does not contain a valid Tableau Server user name.

The user name in the UPN or CN fields is missing or invalid.

When Tableau Server is configured to use UPN or CN mapping, the server reads the user's name from the UPN or CN field of the certificate and then looks up the user name in Active Directory or in the local repository on Tableau Server. (The specific field that the server reads depends on which mapping—UPN or CN—the server is configured to use.) If the field that is supposed to contain the user name has nothing in it, the user sees the following message:

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator.

If a client certificate contains a user name but Active Directory and Tableau Server don't recognize the user name, the user sees the following message:

Certificate does not contain a valid Tableau Server user name.

This can occur when all of the following conditions are true:

- Tableau Server is configured to use UPN or CN mapping.
- Fallback authentication is not enabled.
The client certificate has no user name in the UPN or CN field, or the user name in the
UPN or CN field does not match a user name in Active Directory or on Tableau Server.

To resolve this issue, the system administrator should make sure that the user’s certificate
has the correct user name in the UPN or CN fields of the certificate.

The user is signed in using an unexpected user name (LDAP mapping)

When the server is configured to use Active Directory authentication and LDAP mapping,
the certificate is linked to a user in Active Directory. If the certificate contains a user name in
the UPN or CN field, that user name is ignored.

If the intention is that the user should be signed in with the user name in the UPN or CN
fields, the server should be configured to use UPN or CN mapping.

The user is signed in as the incorrect user (UPN or CN mapping)

Under some circumstances, the user name in a UPN or CN field in the client certificate can
be ambiguous. The result is that a user is signed in to the incorrect identity.

For more information about the conditions under which this issue can occur, see Ambiguous
user names in multi-domain organizations in the topic Mapping a Client Certificate to a User
During Mutual Authentication.

Example: SSL Certificate - Generate a Key and CSR

Important: This example is intended to provide general guidance to IT professionals who are experienced with SSL require-
ments and configuration. The procedure described in this article is just one of many available methods you can use to gen-
erate the required files. The process described here should be treated as an example and not as a recommendation.
When you configure Tableau Server to use Secure Sockets Layer (SSL) encryption, this helps ensure that access to the server is secure and that data sent between Tableau Server and Tableau Desktop is protected.

Tableau Server uses Apache, which includes OpenSSL. You can use the OpenSSL toolkit to generate a key file and Certificate Signing Request (CSR) which can then be used to obtain a signed SSL certificate.

Steps to generate a key and CSR

To configure Tableau Server to use SSL, you must have an SSL certificate. To obtain the SSL certificate, complete the steps:

1. Set the OpenSSL configuration environment variable (optional).
2. Generate a key file.
3. Create a Certificate Signing Request (CSR).
4. Send the CSR to a certificate authority (CA) to obtain an SSL certificate.
5. Use the key and certificate to configure Tableau Server to use SSL.

You can find additional information on the SSL FAQ page on the Apache Software Foundation website.

Configure a certificate for multiple domain names

Tableau Server allows SSL for multiple domains. To set up this environment, you need to modify the OpenSSL configuration file, openssl.conf, and configure a Subject Alternative Name (SAN) certificate on Tableau Server. See For SAN certificates: modify the OpenSSL configuration file below.

Set the OpenSSL configuration environment variable (optional)

To avoid using the -config argument with every use of openssl.exe, you can use the OPENSSL_CONF environment variable to ensure that the correct configuration file is used and all configuration changes made in subsequent procedures in this article produce expec-
ted results (for example, you must set the environment variable to add a SAN to your certificate).

Open the Command Prompt as an administrator, and run the following command:

```
set OPENSSL_CONF=c:\Program Files\Tableau\Tableau Server-<version>\apache\conf\openssl.cnf
```

**Notes:**

- When setting the Open SSL configuration environment variable, do not enclose the file path with quotation marks.

- If you are using a 32-bit version of Tableau Server on a 64-bit computer, run the `set OPENSSL_CONF=c:\Program Files (x86)\Tableau\Tableau Server-<version>\apache\conf\openssl.cnf` command instead.

**Generate a key**

Generate a key file that you will use to generate a certificate signing request.

1. Open the Command Prompt as an administrator, and navigate to the Apache "bin" directory for Tableau Server. For example, run the following command:

```
cd C:\Program Files\Tableau\Tableau Server-<version>\apache\bin
```

2. Run the following command to create the key file:

```
openssl.exe genrsa -out <yourcertname>.key 4096
```

**Note:** This command uses a 4096-bit length for the key. You should choose a bit length that is at least 2048 bits because communication encrypted with a shorter bit length is less secure. If a value is not provided, 512 bits is used.
Create a certificate signing request to send to a certificate authority

Use the key file you created in the procedure above to generate the certificate signing request (CSR). You send the CSR to a certificate authority (CA) to obtain a signed certificate.

**Note:** If you want to configure a SAN certificate to use SSL for multiple domains, first complete the steps in For SAN certificates: modify the OpenSSL configuration file below, and then return to here to generate a CSR.

1. Run the following command to create a certificate signing request (CSR) file:

   openssl.exe req -new -key yourcertname.key -out yourcertname.csr

   If you did not set the OpenSSL configuration environment variable, OPENSSL_CONF, you might see either of the following messages:

   - An error message about the config information being unable to load. In this case, retype the command above with the following parameter: `-config ..\\conf\openssl.cnf`.

   - A warning that the /usr/local/ssl directory cannot be found. This directory does not exist on Windows, and you can simply ignore this message. The file is created successfully.

   To set an OpenSSL configuration environment variable, see Set the OpenSSL configuration environment variable (optional) section in this article.

2. When prompted, enter the required information.
**Note:** For **Common Name**, type the Tableau Server name. The Tableau Server name is the URL that will be used to reach the Tableau Server. For example, if you reach Tableau Server by typing `tableau.example.com` in the address bar of your browser, then `tableau.example.com` is the common name. If the common name does not resolve to the server name, errors will occur when a browser or Tableau Desktop tries to connect to Tableau Server.

Send the CSR to a certificate authority to obtain an SSL certificate

Send the CSR to a commercial certificate authority (CA) to request the digital certificate. For information, see the Wikipedia article **Certificate authority** and any related articles that help you decide which CA to use.

**Use the key and certificate to configure Tableau Server**

When you have both the key and the certificate, you can configure Tableau Server to use SSL by completing the steps in Configure External SSL.

For SAN certificates: modify the OpenSSL configuration file

In a standard installation of OpenSSL, some features are disabled by default. To use SSL with multiple domain names, before you generate the CSR, complete these steps to modify the `openssl.cnf` file.

1. Open Windows Explorer and browse to the Apache `conf` folder for Tableau Server.
   
   *For example:* `C:\Program Files\Tableau\Tableau Server-<version>\apache\conf`

2. Open `openssl.cnf` in a text editor, and find the following line: `req_extensions =`
v3_req

This line might be commented out with a hash sign (#) at the beginning of the line.

```
UTF8Strings
# so use this option with caution!
string_mask = nombstr

# req_extensions = v3_req # The extensions to add to a certificate request

[ req_distinguished_name ]
countryName = Country Name (2 letter code)
```

If the line is commented out, uncomment it by removing the # and space characters from the beginning of the line.

3. Move to the [ v3_req ] section of the file. The first few lines contain the following text:

```
# Extensions to add to a certificate request
basicConstraints = CA:FALSE
keyUsage = nonRepudiation, digitalSignature, keyEncipherment
```

After the keyUsage line, insert the following line:

```
subjectAltName = @alt_names
```

If creating a self-signed SAN certificate, do the following to give the certificate permission to sign the certificate:

a. Add the cRLSign and keyCertSign to the keyUsage line so it looks like the following:

```
keyUsage = nonRepudiation, digitalSignature, keyEncipherment, cRLSign, keyCertSign
```
b. After the **keyUsage** line, add the following line: `subjectAltName = @alt_names`

4. In the **[alt_names]** section, provide the domain names you want to use with SSL.

   DNS.1 = [domain1]
   DNS.2 = [domain2]
   DNS.3 = [etc]

   The following image shows the results highlighted, with placeholder text that you would replace with your domain names.

   ```
   [ v3_req ]
   # Extensions to add to a certificate request
   basicConstraints = CA:FALSE
   keyUsage = nonRepudiation, digitalSignature, keyEncipherment
   subjectAltName = @alt_names

   [alt_names]
   DNS.1 = domain1
   DNS.2 = domain2
   DNS.3 = etc
   ```

5. Save and close the file.

6. Complete the steps in **Create a certificate signing request to send to a certificate authority** section, above.

Additional information

If you prefer to use a different version of OpenSSL, you can download it from **Open SSL for Windows**.
Security Hardening Checklist

The following list provides recommendations for improving the security ("hardening") of your Tableau Server installation.

1. Update to the current version

We recommend that you always run the latest version of Tableau Server. Additionally, Tableau periodically publishes maintenance releases of Tableau Server that include fixes for known security vulnerabilities. (Information regarding known security vulnerabilities can be found on the Security Bulletins page.) We recommend that you review maintenance release notifications to determine whether you should install them.

To get the latest version or maintenance release of Tableau Server, visit the Customer Portal page. For more information see Upgrade Tableau Server Overview.

2. Configure SSL/TLS with a valid, trusted certificate

Secure Sockets Layer (SSL/TLS) is essential for helping to protect the security of communications with Tableau Server. Configure Tableau Server with a valid, trusted certificate (not a self-signed certificate) so that Tableau Desktop, mobile devices, and web clients can connect to the server over a secured connection. For more information, see SSL.

3. Disable older versions of TLS

Tableau Server uses TLS to authenticate and encrypt many connections between components and with external clients. External clients, such as browsers, Tableau Desktop, Tableau Mobile connect to Tableau using TLS over HTTPS. Transport layer security (TLS) is an improved version of SSL. In fact, older versions of SSL (SSL v2 and SSL v3) are no longer considered to be adequately secure communication standards. As a result, Tableau Server does not allow external clients to use SSL v2 or SSL v3 protocols to connect. We recommend that you only allow external clients to connect to Tableau Server with TLS v1.2.

Specially, we recommend that you disable TLS v1 and TLS v1.1 on Tableau Server. However, before you disable a specific version of TLS, verify that the browsers that your
users connect to Tableau Server with support TLS v1.2. In some cases, you may need to preserve support for TLSv1.1.

The following tabadmin command enables TLS v1.2 (using the "all" parameter) and disables SSL v2, SSL v3, TLS v1, and TLS v1.1 (by prepending the minus [-] character to a given protocol).

```
tabadmin stop

tabadmin set ssl.protocols "all -SSLv2 -SSLv3 -TLSv1 -TLSv1.1"

tabadmin configure

tabadmin start
```

4. Disable Triple-DES cipher suite

The Triple-DES cipher suite is no longer considered adequate to encrypt sessions on the internet. Specifically, running Triple-DES ciphers leaves the Tableau Server vulnerable to information disclosure and denial of service attacks. You can learn more at the National Vulnerability Database webpage for CVE-2016-2183.

Triple-DES is enabled by default on the version of OpenSSL that is running on Tableau Server. However, other deprecated cipher suites (MD5 and RC4) are disabled. To add Triple-DES to the list of disabled ciphers, run the following commands. (The !aNULL parameter forces clients to use a legitimate cipher.)

```
tabadmin stop

tabadmin set ssl.ciphersuite HIGH:MEDIUM:!aNULL:!MD5:!RC4:!3DES

tabadmin configure

tabadmin start
```
5. Configure SSL encryption for internal traffic

Configure Tableau Server to use SSL to encrypt all traffic between the Postgres repository and other server components. By default, SSL is disabled for communications between server components and the repository. We recommend enabling internal SSL for all instances of Tableau Server, even single-server installations. Enabling internal SSL is especially important for multi-node deployments. See Configure Internal SSL.

6. Enable firewall protection

Tableau Server was designed to operate inside a protected internal network. Do not set up Tableau Server in the same network with your internet gateway or in a DMZ. Tableau Server must be protected by external firewall. The platform firewall, such as the Windows firewall, should be enabled to protect Tableau sever in single and multi-node deployments.

In a distributed (multi-node) installation of Tableau Server, communication between nodes does not use secure communication. Therefore, you should enable firewalls on the computers that host Tableau Server. By default, the Tableau installation process configures ports in the Windows firewall so that server components can communicate with each other. If you’re configuring a different firewall, or if you need to configure the Windows firewall after you’ve installed Tableau Server, see Tableau Server Ports to understand which ports and services Tableau Server requires.

To prevent a passive attacker from observing communications between nodes, configure a segregated virtual LAN or other network layer security solution.

**Important:** Do not run Tableau Server, or any components of Tableau Server on the internet or in a DMZ. Tableau Server must be run within the corporate network protected by an internet firewall. We recommend configuring a reverse proxy solution for internet clients that need to connect to Tableau Server. See Configure a reverse proxy server.
7. Restrict access to the server computer and to important directories

Tableau Server configuration files and log files can contain information that is valuable to an attacker. Therefore, restrict physical access to the machine that is running Tableau Server. In addition, make sure that only authorized and trusted users have access to the Tableau Server files in the C:\ProgramData\Tableau directory. By default, the permissions on these directories are restrictive, therefore we do not recommend changing permissions at the directory level.

8. Update the Tableau Server Run As User account

By default, Tableau Server runs under the predefined Network Services (NT Authority\Network Service) Windows account. Using the default account is acceptable in scenarios where Tableau Server does not need to connect to external data sources that require Windows authentication. However, if your users require access to data sources that are authenticated by Active Directory, update the Run As User to a domain account. It’s important to minimize the rights of the account that you use for the Run As User. For more information, see Run As User.

9. Generate fresh asset keys

Tableau Server encrypts embedded database credentials before they are stored in the repository. The credentials are encrypted with asset keys. We recommend that after you install Tableau Server, you generate new encryption keys for your deployment. To do this, use the tabadmin assetkeys command.

10. Refresh server token and encryption key

Any Tableau Server service that communicates with repository or the cache server must first authenticate with a secret token. The secret token is generated during Tableau Server Setup. In addition, the encryption key that internal SSL uses to encrypt traffic to Postgres repository is also generated at during Setup. If your organization follows a security policy to update shared secrets and encryption keys on a regular schedule, you should include the
token and key in that process. See the tabadmin regenerate_internal_tokens command for more information.

11. Disable services that you’re not using

To minimize the attack surface of the Tableau Server, disable any connection points that are not needed.

REST API

The REST API interface is enabled by default. If no applications will make REST API calls to your installation of Tableau Server 9.3 (or later), disable it by using the following sequence of tabadmin commands:

```
tabadmin stop

tabadmin set api.server.enabled false

tabadmin configure

tabadmin start

You can disable REST API only on versions of Tableau Server 9.3 and later.

JMX Service

JMX is disabled by default. If it’s enabled but you’re not using it, you should disable it by using the following sequence of tabadmin commands:

```
tabadmin stop

tabadmin set service.jmx_enabled false

tabadmin configure

tabadmin start
```
12. Verify session lifetime configuration

By default, Tableau Server does not have an absolute session timeout. This means that client sessions can remain open indefinitely if the Tableau Server inactivity timeout is not exceeded. (The default inactivity timeout is 240 minutes.)

If your security policy requires it, you can set an absolute session timeout. Before you do that, you must enable session lifetime timeout. Use the following sequence of `tabadmin` commands.

```
tabadmin stop
```

```
tabadmin set wgserver.session.apply_lifetime_limit true
```

```
tabadmin set wgserver.session.lifetime_limit "value", where value is the number of minutes. The default is 1440, which is 24 hours.
```

```
tabadmin set wgserver.session.idle_limit "value", where value is the number of minutes. The default is 240.
```

```
tabadmin configure
```

```
tabadmin start
```

13. Configure a server safelist for file-based data sources

By default, Tableau Server allows authorized Tableau Server users to build workbooks that use files on the server as file-based data sources (such as spreadsheets). In this scenario, files are accessed by the Run As User account.

To prevent unwanted access to files, we recommend that you configure safelist (sometimes referred to as "whitelist") functionality. This lets you limit Run As User access to just the directory paths where you host data files.

1. On the computer running Tableau Server, identify the directories where you will host data source files.
Important Make sure the file paths you specify in this procedure exist on the server. If the paths do not exist when the computer starts, Tableau Server will not start.

2. Run the following `tabadmin` commands:

```
tabadmin stop

tabadmin set native_api.allowed_paths "path", where path is the directory to add to the safelist. Note! All subdirectories of the specified path will be added to the safelist. If you want to specify multiple paths, separate them with a semicolon, as in this example:

```
tabadmin set native_api.allowed_paths "c:\data-sources;c:\HR\data"
```

```
tabadmin configure

```
tabadmin start
```

14. Enable HTTP Strict Transport Security for web browser clients

HTTP Strict Transport Security (HSTS) is a policy configured on web application services, such as Tableau Server. When a conforming browser encounters a web application running HSTS, then all communications with the service must be over a secured (HTTPS) connection. HSTS is supported by major browsers.

For more information about how HSTS works and the browsers that support it, see The Open Web Application Security Project web page, HTTP Strict Transport Security Cheat Sheet.

To enable HSTS, run the following `tabadmin` commands on Tableau Server:

```
tabadmin stop

tabadmin set gateway.http.hsts: true
```
By default, HSTS policy is set for one year (31536000 seconds). This time period specifies the amount of time in which the browser will access the server over HTTPS. You should consider setting a short max-age during initial roll-out of HSTS. To change this time period, run `tabadmin set gateway.http.hsts_options: max-age=<seconds>`. For example, to set HSTS policy time period to 30 days, enter `tabadmin set gateway.http.hsts_options: max-age=2592000`.

```
tabadmin configure
tabadmin start
```

15. Disable Guest access

Core-based licenses of Tableau Server include a Guest user option, which allows any user in your organization to see and interact with Tableau views embedded in web pages.

Guest user access is enabled by default on Tableau Servers deployed with core-based licensing.

Guest access allows users to see embedded views. The Guest user cannot browse the Tableau Server interface or see server interface elements in the view, such as user name, account settings, comments, and so on.

If your organization has deployed Tableau Server with core licensing and Guest access is not required, then disable Guest access.

You can disable Guest access at the server or site level.

You must be a server administrator to disable the Guest account at either the server or the site level.

**To disable Guest access at the server level:**

1. In the site menu, click Manage All Sites and then click Settings > General.
2. For Guest Access, clear the Enable Guest account check box.
3. Click Save.
To disable Guest access for a site:

1. In the site menu, select a site.

2. Click Settings, and on the Settings page, clear the Enable Guest account check box.

For more information, see Guest User.

Change List

<table>
<thead>
<tr>
<th>Date</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2016</td>
<td>Added &quot;Disable Triple-DES cipher suite&quot;</td>
</tr>
<tr>
<td>May 2017</td>
<td>Added &quot;Enable HTTP Strict Transport Security for web browser clients;&quot; &quot;Disable Guest Access&quot;</td>
</tr>
</tbody>
</table>

Manage Licenses

Licensing Overview

Tableau Server licenses have two aspects: the license model and the license metric.

License model: term or perpetual

Tableau Server can be licensed under two models: a term license and a perpetual license. Term licenses, also referred to as subscription licenses, allow you to use and update Tableau Server for a specified period of time. Perpetual licenses do not expire, so you can continue to use Tableau Server as long as you want. However, to get access to product updates and technical support you must purchase Support and Maintenance services.

License metric: user-based or core-based

In addition to the license model, your license is also defined by the metric that permits use of Tableau Server.
• A user-based license metric allows you to deploy Tableau Server on a single computer or on multiple computers in a cluster. Each user that accesses Tableau Server must be licensed. Administrators add and license users.

• A core-based license metric imposes no constraints on the number of user accounts in Tableau Server. Instead, the license specifies the maximum number of computer cores on which you can run Tableau Server. You can install Tableau Server on a single computer or across multiple computers as a multi-node cluster, as long as the total number of cores in all the computers does not exceed the total number that the license allows.

**Note:** Not all processes installed with Tableau Server impact the calculation of total number of cores used. A subset of processes are considered "licensed processes." Core licensing is calculated only on computers running licensed processes. If a computer has one or more licensed processes installed on it, the cores on that computer count toward the total cores used. For more information about licensed processes, see Licensed processes.

The topics in this section provide guidance about how to view and refresh Tableau licensing, as well as a topic that describes how to add user capacity on Tableau Server.

**Note:** As a Tableau Server administrator, you may also be tasked with managing Tableau Desktop deployment and tracking license usage on client computers. If your organization will be using Desktop License reporting, you need to configure Tableau Server to support this. For details, see Configure Desktop License Reporting. For additional information on licensing and management tasks related to Tableau Desktop, see The Tableau Desktop Deployment Guide.
View Server Licenses

Server administrators can view the license and product key information for Tableau Server.

Tableau Server site roles do not correspond to user licenses that you purchase from Tableau (if you are using user-based licensing instead of core-based server licensing). Those licenses allow a certain number of users on the server.

To view server licenses:

- On a server with a single site, click **Settings** and **Licenses**:

  ![Settings and Licenses](image)

- On a multi-site server, click **Manage All Sites** on the site menu, **Settings**, and **Licenses**:

  ![Settings and Licenses](image)

  **Note:** The **Manage All Sites** option only displays when you are signed in as a server administrator.

If you have a user-based Tableau Server license, you can review how these levels have been distributed.

If you have a core-based Tableau Server license, the Licenses page shows how many cores are allowed, how many have been licensed, and how many are in use (and on what server computers).
Refresh Maintenance Date for the Product Key

If the maintenance date for your product key is not up-to-date, refresh the product key. Refreshing the product key will update the product key with the date that your current maintenance period expires and stops expiration messages you may have already received. If you believe that the latest displayed date is incorrect, contact Tableau Support.

**Note:** This topic describes how to refresh the maintenance date for Tableau Server. For information about refreshing the maintenance date on Tableau Desktop see Refreshing Tableau Desktop Product Key in the Tableau Knowledge Base.

Refresh the product key

1. On Tableau Server: Click Start, and select All Programs > Tableau Server > Manage Product Keys.

2. In Manage Product Keys, select the product key, and then click Refresh.

![Manage Product Keys](image)

The latest maintenance date will be retrieved and updated.

3. Verify that the **Maintenance Expires** date has been updated.
4. Click **Close**.

5. Restart the server processes if you are refreshing a user-based license maintenance date. If you are refreshing a core-based license, then you do not need to restart the server.

**Add Capacity to Tableau Server**

You may need to add capacity to your Tableau Server installation to allow you to increase the number of users (if you have a user-based license) or the number of cores (if you have a core-based license).

Tableau Software will provide you with a new product key that adds capacity to your existing Tableau Server installation. You need to activate this key and use it together with your existing product key(s) to get the combined capacity you are licensed for.

Follow the steps below to add a product key to Tableau Server.

**Note:** This process requires a restart of Tableau Server.

1. Start the Product Key Manager:

   In Windows, select **Start > All Programs > Tableau Server <version> > Manage Product Keys**.

2. Click **Activate** in the Manage Product Key dialog box:
3. Enter or paste your new product key and click **Activate**:

![Activate Tableau Server](image)

If you need help with your product key, contact Tableau Customer Service at customerservice@tableau.com or file a support request at http://www.tableau.com/support/request.

4. Restart Tableau Server after registration is complete.

**Automate Licensing Tasks**

Several command line options allow you to perform common licensing tasks for Tableau Server using automated scripts.

If you want to perform these licensing tasks for Tableau Desktop using automated scripts, see [Deploy Tableau Desktop](#) in the Desktop Deployment Guide.

**Command Line Tool Options and Better Script Automation**

You can a utility called `tabinstallck.exe` to script the activation, refresh, and deactivation of server license keys. `tabinstallck.exe` is installed in the Tableau Server `\bin` directory on the primary server node. For example:
D:\Tableau\Tableau Server\<version>\bin

Note: You can also use tabadmin to perform these licensing tasks, but in order to do this Tableau Server must already be deployed and configured, so tabinstalck.exe provides a way to script the licensing step for a new Tableau Server installation that is not completely configured.

To use tabinstalck.exe, you need to run the commands or script as an administrator on the primary Tableau Server node.

Activate

Activate a Tableau Server license using the -activate option:

start/wait tabinstalck.exe -activate <product_key>

Refresh

Refresh a Tableau Server license using the -refresh option:

/wait tabinstalck.exe -refresh <product_key>

Deactivate

Deactivate a Tableau Server license using the -return option:

start/wait tabinstalck.exe -return <product_key>

Example

An example of a script to activate Tableau Server might look like this:

@echo off
start/wait tabinstalck.exe -activate <product_key>
if %errorlevel% EQU 0 (ECHO SUCCESS) ELSE (ECHO FAILED)
Error Handling

When you use `tabinstallck.exe` to automate Tableau Server licensing tasks, status information is returned as an exit code in the ERRORLEVEL environment variable. If activation was successful, the exit code is 0 (zero). The table below lists exit codes from the activation process and what they mean. You can also find error information in the `tabinstallck.log` file. This log file is located in the Tableau Server \logs folder, by default:

```
C:\ProgramData\Tableau\Tableau Server\logs
```

The ProgramData folder is hidden by default.

This example script shows how to activate Tableau Server and check for specific errors, such as an invalid product key (536871018) and general licensing issues (536871012).

```
@echo off
start/wait tabinstallck.exe -activate <product_key>
if %errorlevel% EQU 536871018 (ECHO TABLEAU_ERROR_LICENSING_INVALID_KEY)
if %errorlevel% EQU 536871012 (ECHO TABLEAU_ERROR_LICENCING_GENERAL)
if %errorlevel% EQU 0 (ECHO SUCCESS)
```

<table>
<thead>
<tr>
<th>Exit Code</th>
<th>Message</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>536871012</td>
<td>TABLEAU_ERROR_LICENSING_GENERAL</td>
<td>An unknown error occurred during the licensing operation.</td>
</tr>
<tr>
<td>536871013</td>
<td>TABLEAU_ERROR_LICENSING_INTERNAL</td>
<td>The product is unable to start due to an internal licensing error.</td>
</tr>
<tr>
<td>536871014</td>
<td>TABLEAU_ERROR_LICENSING_SETUP</td>
<td>The product is unable to start due to an internal licensing error.</td>
</tr>
<tr>
<td>536871015</td>
<td>TABLEAU_ERROR_LICENSING_CONNECT</td>
<td>An error occurred contacting the Tableau license server.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Error Description</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>536871017</td>
<td>An error occurred while activating the ASR.</td>
<td></td>
</tr>
<tr>
<td>536871016</td>
<td>Activation failed, please try again.</td>
<td></td>
</tr>
<tr>
<td>536871018</td>
<td>Invalid product key.</td>
<td></td>
</tr>
<tr>
<td>536871019</td>
<td>Unable to complete offline activation.</td>
<td></td>
</tr>
<tr>
<td>536871020</td>
<td>An error was returned from the license server. Check the Tableau log file for more information.</td>
<td></td>
</tr>
<tr>
<td>536871021</td>
<td>Failed to deactivate the license because you have reached the limit of deactivations for this license.</td>
<td></td>
</tr>
<tr>
<td>536871022</td>
<td>An unknown error occurred during the unlicensing operation. Check your product key or contact support.</td>
<td></td>
</tr>
<tr>
<td>536871023</td>
<td>No licenses found.</td>
<td></td>
</tr>
<tr>
<td>536871024</td>
<td>Only expired product keys were found.</td>
<td></td>
</tr>
<tr>
<td>536871025</td>
<td>Your trial for this version has ended.</td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Error Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>LICENSING_UNLICENSED_EXPIRED_TRIAL</td>
<td>TABLEAU_ERROR_LICENSING_UNLICENSED_EXPIRED_TRIAL</td>
<td>The product key is expired.</td>
</tr>
<tr>
<td>536871026</td>
<td>TABLEAU_ERROR_LICENSING_UNLICENSED_EXPIRED_SUBSCRIPTION</td>
<td>Maintenance has expired.</td>
</tr>
<tr>
<td>536871027</td>
<td>TABLEAU_ERROR_LICENSING_UNLICENSED_EXPIRED_MAINTENANCE</td>
<td>Maintenance has expired.</td>
</tr>
<tr>
<td>536871028</td>
<td>TABLEAU_ERROR_LICENSING_RESYNC_GENERAL</td>
<td>Your product keys could not be synchronized.</td>
</tr>
<tr>
<td>536871029</td>
<td>TABLEAU_ERROR_LICENSING_REGISTRATION_GENERAL</td>
<td>An error occurred during product registration.</td>
</tr>
<tr>
<td>536871030</td>
<td>TABLEAU_ERROR_LICENSING_SERVICE_INSTALL</td>
<td>An unknown error occurred during licensing operations.</td>
</tr>
<tr>
<td>536871031</td>
<td>TABLEAU_ERROR_LICENSING_SERVICE_UNINSTALL</td>
<td>An unknown error occurred during licensing operations.</td>
</tr>
</tbody>
</table>

**Handle an Unlicensed Server**

Tableau offers two licensing models: user-based and core-based. User-based licensing requires each active user account to be covered by a license. User-based licenses have a defined capacity, or number of users that it allows. Each user is assigned a unique user name on the server and is required to identify himself when connecting to the server.
Core-based licensing has no constraints on the number of user accounts in the system, but it does restrict the maximum number of processor cores that Tableau Server can use. You can install Tableau Server on one or more machines to create a cluster, with the restriction that the total number of cores in all the machines does not exceed the number of cores you have licensed and that all of the cores on a particular machine are covered by the license.

Unlicensed User-Based Server

The most common reason for a server that has user-based licensing to be unlicensed is an expired product key or an expired maintenance contract. You can see your products keys and add new ones by selecting Start > All Programs > Tableau Server > Manage Product Keys.

Unlicensed Core-Based Server

A core-based server can become unlicensed for a variety of reasons. A common problem is that the primary or a worker node has more cores than the license allows. When the server is unlicensed you may not be able to start or administer the server. You can, however, manage your licenses using the tabadmin command line tool. Follow the steps below to see a list of your licenses and number of cores by machine.

1. Open a command prompt as administrator and navigate to the Tableau Server bin directory. For example, on a default install, type the following: cd C:\Program Files\Tableau\Tableau Server\10.2\bin
2. Type the following: tabadmin licenses -p.

Manage Sites

Sites Overview

The topics in this section describe aspects of working with multiple sites such as which type of authentication is used, as well as things you should know about user licenses, and administrator roles.
If you are not familiar with the concept of sites and how users interact with them and how Tableau Server is used to manage them, read What is a Site? before proceeding.

Authentication and sign-in credentials

All sites on a server use the same Run As User account and user authentication mode. You choose both of these settings when you install Tableau Server. See Configure General Server Options for more information.

Users who belong to more than one site on the same server system use the same credentials for each site. For example, if Jane Smith has a user name of jsmith and a password of MyPassword on Site A, she uses those same credentials on Site B. When she signs in to Tableau Server, she’ll be able to choose which site she wants to access.

The Default site

To help you transition smoothly from a single- to multi-site server system, Tableau Server installs with a site named Default. If you’re running in single-site mode, you don’t need to explicitly use Default, it happens automatically. However, if you add one or more sites, Default becomes one of the sites you can sign in to when you sign in to Tableau Server. Default differs from sites that you add to the system in the following ways:

- It can never be deleted but, just like sites that you add, it can be renamed.
- It stores the samples and data connections that ship with Tableau Server.
- The URL used for Default does not specify a site. For example, the URL for a view named Profits on a site named Sales is http://localhost/#/site/sales/views/profits. The URL for this same view on the Default site would be http://localhost/#/views/profits.

Site administrator and server administrator site roles

There are two types of administrators in Tableau Server, server administrators and site administrators. For each site, server administrators can control whether site administrators can add and remove users for the sites they manage (select Site <name> > Settings).
Managing Users
Who is allowed to add and remove users.
- Only server administrators
- Server and site administrators
  Limit the number of users to:
    - Server limit
    - [ ] users

If **Only server administrators** is selected, site administrators cannot add or remove site users. However, they can still manage groups, projects, workbooks, and data connections within their site. If **Server and site administrators** is selected (the default), site administrators can do all of the above, and add or remove users.

Licensing and user limits

Users can belong to multiple sites, with different site roles and permissions on each site. A user who belongs to several sites, however, does not need a license for each site. Each server user only needs one license.

Server administrators can use the **Limit number of users** setting (select **Site <name> > Settings**) to specify a user limit for the site. Only licensed users are counted; server administrators are excluded. For example, if a site has 90 licensed users, 20 unlicensed users, and one server administrator, the user count is 90. If **Limit number of users** is set to **100**, 10 more licensed users can be added.

Add or Edit Sites

Server administrators can add sites to Tableau Server, or edit existing sites. Even before you add a site, Tableau Server will have a Default site.

1. Open the Sites page. If you are adding the first site on the server, select **Settings > Add a Site**, and the click **Add a Site**.
Otherwise, in the site menu, click **Manage All Sites**, click the **Sites** menu, and then click **New Site**.

To edit a site, select the site you want to modify, and then select **Edit Settings**. In a single-site deployment, click **Settings**, and then click the **General** tab.
2. Enter a **Site name** and **Site ID** for the site (if you are editing the Default site, you cannot change the **Site ID**):

![Image of Sites page]

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Name:</strong></td>
</tr>
<tr>
<td><strong>Site ID:</strong></td>
</tr>
<tr>
<td><strong>URL:</strong></td>
</tr>
</tbody>
</table>

**Note** The “#/site” in the URL (for example, http://localhost/#!/site/sales) cannot be changed. In multi-site server systems, it appears in the URL for sites other than the **Default site**.

3. Workbooks, extracts, and data sources all consume storage space on the server. For **Storage**, select either **Server Limit** or **GB**, and enter the number of GB you want as a limit.
If you set a server limit and the site exceeds it, publishers will be prevented from uploading new content until the site is under the limit again. Server administrators can track where the site is relative to its limit using the Max Storage and Storage Used columns on the Sites page.

4. Select whether only you, the server administrator, can add and remove users (Only server administrators) or if it can be done by both types of administrators (Server and site administrators).
If you are allowing site administrators to add users, specify how many users they can add to the site by selecting one of the following:

- **Server limit**: For a server with user-based licensing, the limit is the number of available server seat licenses. For a server with core-based licensing, there is no limit to the number of users that can be added. For more information, see View Server Licenses and Handle an Unlicensed Server.

- **<n> users**: Allows a site administrator to add users up to a limit you specify. See Work with Sites for information on licensing and user limits.

5. Leave **Allow users to use web authoring** selected or clear it to disable authoring for content in the site (not server-wide).

Disabling web authoring means that users cannot edit published workbooks from the server web environment. To update a workbook published to the server, a Tableau Desktop user must re-publish it. For more information, see Set a Site’s Web Authoring Access.

6. For **Subscriptions**, keep **Allow users to subscribe to workbooks and views** selected if you want site users to be able to subscribe to views. Keep **Allow content owners to subscribe other users to workbooks and views** to allow administrators, project leaders, and content owners to set up subscriptions for other users. These options are visible only if you have configured subscription settings.
You can also enter a custom **From address** for the subscriptions. While the address you enter should use valid email address syntax (such as `bizdev@myco.com` or `noreply@sales`), Tableau Server does not require it to correspond to a real email account (some SMTP servers may require it to be an actual address, however).

For **Email footer**, select **Custom footer** and enter the text you want to display above the Tableau Server URL in subscription footers.

The email footer will look similar to the following:
7. Select **Record workbook performance metrics** to permit your site users to collect metrics on how workbooks perform, such as how quickly they load.

In addition to having this check box selected for the site, to initiate recording, users must add a parameter to the workbook’s URL. For more information, see [Create a Performance Recording](#).

8. Click **Create** or **Save**.

**Note:** As a server administrator, when you add your first site to Tableau Server, the site menu becomes available and shows the name of the current site. When **All Sites** is selected in the top menu bar, the Users page displays the label **Server Users**, because it pertains to all users on the server. When a site is selected in the top menu bar, the Users page displays the label **Site Users**. As a server administrator, you can add users to the server, or to individual sites. For more information, see [Create Users and Groups](#) and [What is a Site?](#).

### Import or Export a Site

You can provision a new Tableau Server site by exporting an existing site to a file and importing the file into a new site. The site you export is called the **source site**. The site into which you import is called the **target site**.

The source site can come from Tableau Online, which is a cloud-based installation of Tableau Server that is hosted by Tableau, or it can come from a Tableau Server deployment that you administer. When you import a site, all of the source site’s resources—including
workbooks, projects, data sources, users—come with it. The import also includes any permissions, subscriptions, or user favorites lists that have been created. All site-specific settings from the source site (including site quota, subscription and web authoring settings) are preserved in the target site.

Before you export

Before you export a site, note the following:

Verify version compatibility. To successfully import a site, the backup that you create must be in the same version family (e.g., 10.1 through 10.1.9) as the Tableau Server where you are importing the site. You cannot import backups into a version outside the version family. For example, you cannot import a backup from version 9.1.3 to a Tableau Server running 9.2.1. For version information, see the Tableau Release Notes.

Delete unused items. Make sure the source site contains only what you want to import. Delete any unused workbooks, projects or data sources.

Remove unused users. Confirm that all users are licensed and remove any who no longer represent actual users. Any user you export from the source site must be imported to the target site. You can't remove users during the import.

Create user accounts on the target server. The site import process assigns users to a target site. The users must already have user accounts on the target server. If you are exporting one site into another on the same Tableau Server, you will have all the user accounts you need. If you are exporting a site from Tableau Online or from a different Tableau server, you must create user accounts on the target server before you can perform the import.

Check user authentication. User authentication is a server-wide setting and all sites on a server must use the same setting. You can export from and import to servers that are using different user authentication methods, but you will need to modify the mapping files used for the import. This step is built into the import process and described in Verify the site mappings. Because Tableau Online sites use a custom user authentication method, exporting from a Tableau Online site requires edits to the user-specific mapping files. This ensures
a clean import, regardless of how the target server is configured.

Check schedules. The Schedules page on Tableau Server lists the default schedules you can use for extract refreshes and schedules:

Refreshes and subscriptions assigned to default schedules on the source site will be automatically mapped to the same schedules on the target site. If the source site has custom schedules, they are imported to the target site and can optionally be renamed when you edit the mapping files.

Configure the target server to deliver subscriptions. Subscriptions will be imported to the new site, but you must configure the target server to deliver the subscriptions, if it isn't already configured. For more information, see Configure Server Alerts.

Create or identify the target site. Before you can import a site file, you must already have a target site on Tableau Server. Anything that exists in the target site that does not also exist in the source site will be removed during the import. Because of this, an empty site is recommended. For more information about creating or making changes to sites, see Add or Edit Sites.
Notes: If the target site is not empty, workbooks and data sources with identical names on both target and source sites will be replaced by workbooks, data sources, and permissions from the source site, and can be verified by the timestamp.

If your source site has workbooks that use published data sources, the target site name must match the source site name. The data connections for the workbooks will continue to refer to the source site name and can’t be updated on the new site.

Locate site IDs. The commands you use to export or import a site require a site ID (also known as the content URL) as a parameter. A site ID uniquely identifies a site on Tableau Server. When you are signed in to a site, the site ID is displayed after the # character in the URL.

If the server is not running multiple sites, the web browser URL includes #, but not the word site or the site ID. If you see a URL like that in the following picture, you are using the built-in site, which is named Default.

If the server is running multiple sites, the web browser URL includes #/site/ followed by the site ID for your site, as in the following example:

Tips for importing to a target with fewer users or schedules than the source site

When you import a source site to a target site that has fewer users or schedules than the source site, many-to-one importing is not supported. Consider the following options:
• Remove the extra users or schedules from the target site prior to exporting (preferred option).

• Add the missing users or schedules to the target site before beginning the import.

• Add the missing users or schedules to the target site in the middle of the import process and manually update the mapping files.

• Manually map the users or schedules to different users and schedules in the target site during the import process. This option is required if a user name differs between servers—for example, the exported user named adavis is defined on the target site as davisa.

Export a Site

You don’t need to stop Tableau Server during the export or import process. Run the `tabadmin exportsite` command to export the site.

The site ID for the Tableau Server Default site is " " (double quotation marks, no space). If you are using Windows PowerShell to run the command, enclose the double quotes for the Default site within single quotes (‘”’).

1. Open a command prompt as an administrator and navigate to the bin directory on Tableau Server. For example:
   
   C:\Program Files\Tableau\Tableau Server\10.2\bin

2. Type the following command:

   `tabadmin exportsite <site ID> --file <filename or path>`. 

   For example, to export a site with site ID `wsales` to the following file C:\sites\exported_sites\sales_export.zip, type the following:

   `tabadmin exportsite wsales --file C:\sites\exported_sites\sales_export.zip`
For examples of other options you can use with the exportsite command, see exportsite.

During the export, Tableau Server locks the site.

Import a Site

If you don’t already have a target site for the import, create one. See Add or Edit Sites for steps.

Importing a site is a three-step process. First, run the tabadmin importsite command to generate the files that will be imported. Next, verify files that show how the site will be imported. Finally, run the tabadmin importsite_verified command to finish the import.

Before you begin, you will need the exported site file and the site ID for the target site.

The site ID for the Tableau Server Default site is "" (double quotation marks, no space). If you are using Windows PowerShell to run the command, enclose the double quotes for the Default site within single quotes (''').

While there’s no need to stop Tableau Server during the import process, the site receiving the import will be locked until the import completes.

Start the site import process

1. Open a command prompt as an administrator and navigate to the bin directory on Tableau Server. For example:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

2. Type the following command:

   tabadmin importsite <site ID> --file <filename or path>

   where <site ID> is the site ID of the target site and <filename or path> is the full path to the exported site file.
For example, to import the file C:sites\exported_sites\sales_export.zip into a site with the site ID esales, type the following:

tabadmin importsite esales --file C:sites\exported_sites\sales_export.zip

For examples of other options you can use with the importsite command, see importsite.

3. After you enter the command, the mapping files for you to verify are placed in ProgramData\Tableau\Tableau Server\data\tabsvc\temp\import_<site ID>_<datetime>\mappings. Note this location for the next procedure.

Verify the site mappings

The mapping files that are generated after you initiate a site import with the importsite command show you how the site’s resources will be assigned once the import is complete. Items that Tableau Server was unable to map, and which need editing, are marked in the CSV files with question marks (???). Before you can run the final importsite_verified command you must change the question marks so that they represent valid assignments on the target site.

**Note:** You can’t add or remove users as part of your changes. All user names for the users that you import must already exist on the target server.

If your source site has workbooks that use published data sources, the target site name must match the source site name. The data connections for the workbooks will continue to refer to the source site name and can’t be updated on the new site.

To verify a site’s mapping files

1. Navigate to the directory that was displayed after you entered the importsite command:
2. Using Microsoft Excel (recommended) or a text editor, open each CSV file in the mappings folder.

Each file shows how items from the source site will be mapped, or handled, once the import to the target site is complete.

3. Verify that the mappings are correct. Replace any entry consisting of question marks (???) with a valid value. Use the following tables as a guide:

<table>
<thead>
<tr>
<th>Column title</th>
<th>Can it be edited?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source_name</td>
<td>No</td>
<td>A user group name on the source site.</td>
</tr>
<tr>
<td>source_domain_name</td>
<td>No</td>
<td>The user authentication type on the source site: either local (for Local Authentication) or a domain name</td>
</tr>
</tbody>
</table>
The user authentication type on the source site: either local for Local Authentication, or a domain name (such as example.com or example.lan) for Active Directory.

*Do not edit the target_domain_name value for All Users. Keep its value of local, even if your target server is configured for Active Directory user authentication. The All Users group is a special default user group that must exist on every Tableau Server.

### CSV file name: mappingsScheduleMapper

<table>
<thead>
<tr>
<th>Column title</th>
<th>Can it be edited?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source_name</td>
<td>No</td>
<td>The names of custom and default extract or subscription schedules on the source site.</td>
</tr>
<tr>
<td>source_scheduled_action_type</td>
<td>No</td>
<td>The type of schedule, either Refresh Extract, for extract refreshes, or Subscriptions, for subscription deliveries on the source site.</td>
</tr>
<tr>
<td>target_name</td>
<td>Yes</td>
<td>The names of custom schedules on the target site. You can edit this value. For example, if the schedule is named Fri-</td>
</tr>
</tbody>
</table>
**day Update** on the source site you can rename it **Friday Refresh** on the target site.

<table>
<thead>
<tr>
<th>target_scheduled_action_type</th>
<th>No*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The type of schedule, either **Refresh Extract**, for extract refreshes, or **Subscriptions**, for subscription deliveries on the target site.

*In rare cases, there may be question marks (???) in this column. If there are, replace them with either **Refresh Extract** or **Subscriptions**, matching the entry you see under **source_scheduled_action_type**.

**CSV file name: mappingsSiteMapper**

<table>
<thead>
<tr>
<th>Column title</th>
<th>Can it be edited?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source_url_namespace</td>
<td>No</td>
<td>The site ID of the source site.</td>
</tr>
<tr>
<td>target_url_namespace</td>
<td>No</td>
<td>The site ID of the target site.</td>
</tr>
</tbody>
</table>

**CSV file name: mappingsSystemUserNameMapper**

<table>
<thead>
<tr>
<th>Column title</th>
<th>Can it be edited?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source_name</td>
<td>No</td>
<td>The username of a user on the source site.</td>
</tr>
<tr>
<td>source_domain_name</td>
<td>No</td>
<td>The user authentication type on the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>source site: either <strong>local</strong>, for Local Authentication, a domain name (such as example.com or example.lan) for Active Directory, or <strong>external</strong> (for a Tableau Online site).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>target_name</strong></td>
<td><strong>Yes</strong></td>
<td></td>
</tr>
<tr>
<td>Usernames for users who will be assigned to the target site upon import. Confirm that all the usernames listed exist on the target server system and replace any question marks (???) with a valid username from the target server. You can't create usernames by adding rows to the CSV file. Similarly, you can't remove usernames by deleting rows. You can edit a username in the <strong>target_name</strong> column to be different from its source username as long as it already exists on the target server system using that different name. For example, a user can have a <strong>source_name</strong> value of <a href="mailto:jsmith@myco.com">jsmith@myco.com</a> and a <strong>target_name</strong> value of <a href="mailto:johnsmith@example.com">johnsmith@example.com</a> as long as the username <a href="mailto:johnsmith@example.com">johnsmith@example.com</a> exists on the</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
target server.
You can't map a user on the source site to more than one username on the target site.

| target_domain_name | Yes | The user authentication type on the target site: either **local**, for Local Authentication, or a domain name (such as example.com or example.lan) for Active Directory. |

4. If you make edits, save your changes and preserve the CSV files' formatting. Leave the mapping files in their current location.

**Complete the site import**

1. Open a command prompt as an administrator and navigate to the bin directory on Tableau Server. For example:

   ```
   C:\Program Files\Tableau\Tableau Server\10.2\bin
   ```

2. Type the following command:

   ```
   tabadmin importsite_verified <site ID> --importjobdir <PATH>
   ```

   where `<site ID>` is the site ID of the target site and `<PATH>` is the directory that's one level up from the mappings directory you used in Verify the site mappings. If the path has a space in it, enclose the entire path in quotes. For example:

   ```
   tabadmin importsite_verified esales --importjobdir "C:\ProgramData\Tableau\Tableau Server\data\tabsvc\temp\import_esales_20140409185810071"
   ```
For examples of other options you can use with the `importsite_verified` command, see `importsite_verified`.

3. Open the new site that you just imported and confirm that everything came in as expected.

Delete Sites

Server administrators can delete sites that have been added to Tableau Server. Deleting a site also removes workbooks and data sources that were published to the site, as well as users. If a user belongs to additional sites, they will not be removed. To permanently delete a user, go to the Server Users page.

**Note:** The Default site cannot be deleted.

1. On the site menu, click **Manage All Sites**, and then click **Sites**.

![Sites page in Tableau Server](image)
2. Select the site you want to remove, and click **Delete**.

3. Click **Delete** in the confirmation dialog box that appears.

**Site Availability**

A site can become suspended or locked due to a site import failure, or because a server administrator chooses to suspend the site for a period of time.

When a site is suspended, only the server administrator can activate the site to make it available again.

**Note:** If a site becomes locked and you cannot access the Sites page through the Server interface, use the tabadmin sitestate command to change the state to active.

To activate or suspend a site

1. In the site menu, click **Manage All Sites**, and then click **Sites**.

2. Select the site, and then select **Actions > Activate** or **Suspend**.
Enable Users to Save Revision History

Revision history enables your users to keep copies of workbooks and data sources (content resources) that change. Each time someone saves an update to a content resource, Tableau Server creates a new version and stores it with older versions.

Server administrators can enable revision history on a per-site basis, for all of its workbooks and data sources. You can determine the number of revisions saved in history. Revision history is enabled by default, with a limit of 25 revisions for each content resource.

Authorized users can take actions on earlier versions of their content. By enabling revision history, you give everyone the confidence to experiment with the content, knowing that older versions are always available.

Note: This topic applies to Tableau Server on-premises. Workbook revision history (and not data source revision history) is enabled on all Tableau Online sites.
Required permissions

To access revision history, a user must have a site role of Publisher, plus the following permissions:

- Project: View and Save
- Workbooks in the project: View, Save, and Download Workbook/Save As
- Data sources in the project: View, Save, and Download Data Source

Enable revision history and set number of revisions allowed

1. Sign in to a site as a Server Administrator, and click Settings.

2. Under Revision History, select Save a history of revisions, and enter the maximum number of revisions you want to allow for each content resource.

3. Click Save.

When you lower the number of revisions, the most recent revisions are saved. For example, if you set the limit to 15, the 15 most recent versions of the workbook or data source are saved.

Note: A content resource’s revision history list might not show the changes to the limit until a background cleanup process runs on the server.

Clear all revisions

Server administrators can delete all previous revisions of from a site. The most recent version of each published workbook and data source is always retained.

1. Sign in to a site as a Server Administrator, and click Settings.

2. Under Revision History, click Clear Revision History.

3. Click Save.
Security for previewing and restoring workbooks

When users select **Restore** or **Preview** for workbook revisions, user passwords are exchanged between the user’s browser and the server. Tableau Server encrypts these passwords using public/private key encryption. To ensure these public keys are provided by Tableau Server, you must configure the server to use SSL (https). For more information, see SSL.

See also

*Potential revision history issues* in the User/Analyst section of the online help.

Customize the Server

You can customize how Tableau Server looks in order to personalize it for your company or group. You can perform these customizations:

- Change the server name that appears in the browser tab, tooltips, and messages.
- Change the logos that appear in different server page contexts.
- Control the language used in the server user interface and locale used for views.
- Install custom fonts on Tableau Server and client computers that connect to Tableau Server.

Administrators and project leaders can also add images for projects in thumbnail view.

See the following topics for more information:

Change the Name or Logo

You can customize the Tableau Server look and feel to brand it for your company by changing the server name and by using a custom logo.

Your custom name appears on browser tabs and in a tooltip when users hover over the home logo in the upper left corner of the main page. The customizable logo appears in the
sign-in page, the server page header, and in web authoring pages. (Note that some references to Tableau Server cannot be changed, such as the logo on browser tabs and the phrase "Tableau Server" in the copyright notice.)

A - The Tableau logo for the browser window tab cannot be changed.

B - The server name can be changed using `tabadmin customize name`.

C - The header logo can be changed using `tabadmin customize header_logo`.

Change the server name

The server name is displayed in tooltips, messages, and on the browser window tab. The following example shows a custom name displayed as a tooltip and on the browser window tab.
Note: The copyright information in the About Server dialog box lists Tableau (for example, © 2016, Tableau Software, Incorporated and its licensors. All rights reserved.)

1. Open a command prompt as an administrator and type the following:

   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"

2. Type the following command:

   tabadmin customize name "new_name"

   Replace new_name with your custom name, as in the following example:

   tabadmin customize name "My Company"

   **Note:** To change to a name that includes Unicode characters, identify the hex encoding for each Unicode character and add \u before each hex value. For
example, for the two-character string 测试, type the command \texttt{tabadmin customize name "测试"}.

3. Type the following command to restart the server so that the change takes effect:

\texttt{tabadmin restart}

Change the logo

You can customize the logo that appears on the Tableau Server sign-in page, the header logo in server pages, and the small logo that appears in the upper left when a view is being edited in web authoring. The name "Tableau" is part of this logo. It cannot be changed independently of the logo.

The image files you use should be in GIF, JPEG, or PNG format.

The header\_logo image can be up to 160 by 160 pixels, but not smaller than 32 by 32 pixels. For best results use an image that is 125 by 35 pixels. If the image is larger than 160 by 160 pixels, it is clipped.

The sign\_in\_logo image can be a maximum of 3000 by 3000 pixels.

The small\_logo image can be up to 32 by 32 pixels. For best results use an image that is 32 by 32 pixels.

\textbf{Note:} The background colors differ in these locations, so your logo might look different depending on where it appears in the server interface.
Header logo

This is the default header logo.

This is what a custom header logo might look like.

Sign-in logo
This is the default sign-in logo.

This is what a custom sign-in logo might look like.

Small logo

This is the default small logo for web authoring.
This is what custom small logo might look like for web authoring.

Customize a logo

1. Open a command prompt as an administrator and type the following command:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

2. Type one of the following commands, depending on which logo you want to set. Substitute your own image file for C:\My Pictures\logo.png.

   ```
   tabadmin customize header_logo "C:\My Pictures\logo.png"
   
tabadmin customize sign_in_logo "C:\My Pictures\logo.png"
   
tabadmin customize smalllogo "C:\My Pictures\logo.png"
   ```

   **Note:** If an image for the logo or the header logo is larger than 160 by 160 pixels, it is clipped.

   For more information on the `tabadmin customize` command, see `customize`.

3. Type the following command to restart the server so that the change takes effect:

   ```
   tabadmin restart
   ```
Restore the default name or logo

1. Open a command prompt as an administrator and type the following command:

   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"

2. Type the following command:

   tabadmin customize parameter -d

   For parameter, specify name, logo, header_logo, sign_in_logo, or smalllogo.

3. Type the following command to restart the server so that the change takes effect:

   tabadmin restart

Language and Locale for Tableau Server

Tableau Server is localized into several languages. Server language and locale settings impact how this affects users. The **Language** setting controls user interface (UI) items such as menus and messages. The **Locale** setting controls items in views such as number formatting and currency.

Administrators can configure language and locale on a server-wide basis (see Server Settings (General)), and individual users can configure their own settings (search for "Your Account Settings" in the Tableau Server Help). If a user configures their own language and locale, their settings override the server settings.

Default Settings

The default language for Tableau Server is determined during Setup. If the host computer is configured for a language Tableau Server supports, Tableau Server installs with that language as its default. If the computer is configured for a language that is not supported, Tableau Server installs with English as its default language.

How Language and Locale are Determined
Another influence on which language and locale display when a user clicks a view is the user’s web browser. If a server user has not specified a Language setting on their User Account page, and their web browser is set to a language that Tableau Server supports, the browser’s language will be used—even if Tableau Server itself is set to a different language.

Here’s an example: Assume that Tableau Server has a system-wide setting of English as the Language for all users. Server user Claude does not have a language specified on his Tableau Server User Account page. Claude’s browser uses German (Germany) for its language/locale.

When Claude signs in to Tableau Server, the server UI displays in German and when he clicks a view, the view uses the Germany locale for numbers and currency. If Claude had set his user account Language and Locale to French (France), the UI and view would have been displayed in French. His user account setting supersedes those of his web browser, and both of those have precedence over the Tableau Server system-wide setting.

Another setting to be aware of is the Locale setting in Tableau Desktop (<File> Workbook Locale). This setting determines the locale of the data in the view, such as which currency is listed or how numbers are formatted. By default, Locale in Tableau Desktop is set to Automatic. However, an author can override that by selecting a specific locale. Using the above example, if the author of View A set Locale to Greek (Greece), certain aspects of the data in View A would display using the Greek (Greece) locale.

Tableau Server uses these settings, in this order of precedence, to determine language and locale:

1. Workbook locale (set in Tableau Desktop)
2. Tableau Server User Account language/locale settings
3. Web browser language/locale
4. Tableau Server Maintenance page language/locale settings
5. Host computer’s language/locale settings
Use Custom Fonts in Tableau Server

You can use custom fonts with Tableau Server. When you do this the safest way to guarantee that users have the experience you intend is to keep the following in mind:

- The fonts need to be installed on the computer where Tableau Server is running.
- The fonts need to be installed on any client computers that will connect to Tableau Server. You need to have the fonts installed locally in order for your browser to properly display them.
- As a best practice, use "web safe" fonts that are installed by default on all major browsers. This increases the likelihood that the fonts will display properly on client machines.
- Different browsers render the same fonts differently, so even when a client browser has the custom font installed, it may look different when viewed in different browsers. This can be especially noticeable with comments or titles where specific spacing is used for an intentional effect.

**Note:** For more information about installing fonts in Windows, see the Microsoft Knowledgebase.

Performance

Tableau Server Performance Overview

When you take the time to understand the performance of Tableau Server, you make it easier to serve your users by improving the efficiency of Tableau Server. Although every server environment is unique, and there are many variables that can impact performance, the general steps that you take to understand and act on performance data in Tableau Server are the same.
• **Alerts.** Configure email notifications for important server events. For example, you can receive notifications when server processes become unavailable and when the server is running out of disk space.

• **Monitoring.** Collect and analyze data about Tableau Server to understand how well the server is performing.

• **Tuning.** Make adjustments to tasks, process configurations, and more to improve the performance of Tableau Server.

• **Troubleshooting.** Identify bottlenecks in resources, workbooks, and more to improve the performance of Tableau Server.

### General Performance Guidelines

#### Hardware and Software

**Add more cores and memory:** Regardless of whether you’re running Tableau Server on one computer or several, the general rule is that more CPU cores and more RAM will give you better performance. Make sure you meet the Tableau Server recommended [hardware and software requirements](#) and see the topic When to Add Workers and Reconfigure to assess whether you should add additional machines.

If you are running Tableau Server in a virtual environment, use your VM host’s best practices for vCPU allocation in relation to the number of physical CPU cores on the VM host.

#### Configuration

**Schedule refreshes for off-peak hours:** Backup tasks tend to stall other background tasks until the backup is completed. Use the Background Tasks for Extracts administrative view to see your refresh and backup task schedules. Your refresh tasks should be scheduled for off-peak hours that don’t overlap with your backup window.
Look at caching: Caching helps Tableau Server respond to client requests quickly, especially for views that connect to live databases. Confirm that Refresh Less Often on the Data Connections tab of the Configuration dialog box is selected.

Consider changing two session memory settings:

- **VizQL session timeout limit**: The default VizQL session timeout limit is 30 minutes. Even if a VizQL session is idle, it is still consuming memory and CPU cycles. If you can make do with a lower limit, use tabadmin to change the `vizqlserver.session.expiry.timeout` setting.

- **VizQL clear session**: By default, VizQL sessions are kept in memory even when a user navigates away from a view. This consumes a good deal of session memory. Instead, you can end sessions when users move away from a view by changing the value of the `vizqlserver.clear_session_on_unload` setting to true (the default is false).

Assess your process configuration: Tableau Server is divided into six different components called server processes. While their default configuration is designed to work for a broad range of scenarios, you can also reconfigure them to achieve different performance goals. Specifically, you can control on which computers the processes run and how many are run. See Performance Tuning Examples for general guidelines for one-, two-, and three-node deployments.

Tableau Server Alerts

Alerts are email notifications that you receive when something happens on Tableau Server. You can set up alerts for when the server is running out of disk space and for when server processes stop or start. These conditions often mean that there is an immediate problem.

**Note**: We discuss alerts in this section as a tool for getting information about server health. But as an entirely separate benefit, users can also make use of alerts. After you set up alerts, your users can subscribe to views to periodically receive a snapshot of views they are interested in on a recurring basis.
To send alerts, Tableau Server must connect to a mail server, also known as a Simple Mail Transfer Protocol (SMTP) server. An SMTP server is a service that you can send outbound email messages to. It then relays the messages to whoever they're addressed to. (It doesn't handle incoming email.) To set up alerts, you must configure Tableau Server to communicate with your SMTP mail server.

SMTP information you'll need

Many organizations already have an SMTP server in-house. Before you continue, ask your IT department if there is an SMTP server that you can use.

Here's the SMTP server information that you need from your IT department:

- The server address. This is often something like smtp.example.com or mail.example.com, but other addresses are also possible.

- The port. This is 25 for most servers.

- A user name.

- A password.

Some servers don't require a user name or password because they are only meant for internal use.

You'll also need to decide on a from address for the alerts that the server sends. When people receive an alert email from Tableau Server, this is the name that's on the from line of the message. Because alerts are simply informational, you generally don't need to worry about who's on the from line, so people use addresses like no-reply@example.com or tableau-admin@example.com.

After you get the SMTP server information from your IT department, you can use the Tableau Server Configuration utility to set up alerts.
Step 1: Stop the server

1. Stop Tableau Server. (In the Windows Start menu, search for Stop Tableau Server.)

2. In the Windows Start menu, search for Configure Tableau Server.

Step 2: Configure SMTP information for Tableau Server

1. In the Tableau Server Configuration utility, click the SMTP Setup tab.

2. Enter the information that you received from your IT department.

3. In the Send email from box, enter the email address that you want all server emails to be sent from. For example, you might enter tableau_admin@example.com or no-reply@example.com.

4. In the Send email to box, enter the email address or addresses that you want server-health emails to be sent to. For example, you might enter your own email address and the email address of your IT person.
5. Click **OK**.

6. Start Tableau Server (in the Windows Start menu, search for **Start Tableau Server**).

**Step 3: Set up alerts**

In the Tableau Server Configuration utility, click the **Alerts and Subscriptions** tab. We recommend that you select all the checkboxes on this tab to enable all alerts. You'll know that alerts are working when you restart Tableau Server and receive an email.
If you do select all the check boxes, here are the alerts that get activated.

Subscriptions to views

Users can periodically receive a snapshot of views that they're interested in. This can be useful if your users want to see information about views on a recurring basis. For example, users can get a view in their inboxes every week.

Server component events

You can receive a notification when Tableau Server processes stop or start. If you install Tableau Server on multiple nodes, you can see a notification for each process that stops or starts. If you install Tableau Server on a single node, you can see a notification for each process that starts, but not for each process that stops. Because part of the server must be running in order to send an alert that processes have stopped, you see only notifications when the data engine, repository, and gateway processes stop.
Anytime that server processes stop or that the server restarts unexpectedly, you should investigate the cause of the restart. For example, you may discover that the Windows Server computer is configured to restart automatically after Windows updates—in which case you may want to schedule updates for off-peak hours.

Low disk space

You can receive a notification when the disk space on the server computer falls below a threshold that you specify. As a general rule, we recommend that the server computer maintain at least 20% free disk space. The farther that the disk space falls below this threshold, the more likely that the server's performance will be affected. Eventually, the server may even stop responding.

Step 4: Restart the server

On the Windows Start menu, click All Programs > Tableau Server 10.2 > Start Tableau Server. If alerts are configured correctly, Tableau Server sends an email titled "Multiple services on your-server are UP."

Performance Monitoring

When you monitor a server, you collect and analyze data that signals whether the server is performing badly or running into problems. For example, if you notice that your server is using 100% of its processing capacity for long periods of time, you know that there's a problem.

The data that you need to collect and analyze can be broken down into the following broad categories:

- Resource usage data—how Tableau Server uses hardware resources like diskspace, memory, and processors.
- Session and load time data—how users interact with Tableau Server, including how long it takes for views to load and how many concurrent users there are.
- Background task data—how Tableau Server runs tasks that are not directly tied to a
user action. For example, background tasks include extract refresh tasks, subscription tasks, and more.

Some of this data, including load time data and extract refresh data, is already accessible from the administrative views that are built into Tableau Server. However, to collect resource usage data you need to use an external performance monitoring tool. (For the purposes of this section, we’ll use Windows Performance Monitor as an example, because it’s included with Windows Server.) To collect additional load time data and background task data, you can connect to the Tableau Server repository.

After you’ve collected the performance data that you want to analyze, you can use the sample workbook included in this section as a starting point for analyzing your performance data. To make it easier to analyze your performance data in one place, you can then publish the views that you create to Tableau Server as custom administrative views.

For more information on the built-in administrative views, see Administrative Views.

For more information on custom administrative views, see Create Custom Administrative Views.

**Note:** To use the sample workbook and to publish views to Tableau Server, you must have Tableau Desktop.

### Collect Data with Windows Performance Monitor

To monitor resource usage and server processes, you can use Windows Performance Monitor (PerfMon), which is included with Windows Server. Use PerfMon to gather detailed performance information, including how often the CPU is being used, how much memory is being used, information about each Tableau Server process, and more.

For more information about what each Tableau Server process does, see Tableau Server Processes.
Disclaimer: This information refers to a third-party product. This example is not an endorsement of this product over any other competing products.

Before you can use PerfMon, you set up a data collector set, which is how PerfMon stores the data that it collects. To collect information about Tableau Server processes with PerfMon, Tableau Server must be running when you create the data collector set. The data that you collect in PerfMon are often referred to as performance counters.

Step 1: Create a new data collector set

1. Click the Windows Start menu and search for "performance".

2. Right-click Performance Monitor and then click Run as administrator.

3. In the left pane, click Data Collector Sets.

4. In the right pane, right-click User Defined, click New, and then click Data Collector Set.

5. In the Create new Data Collector Set wizard, enter a name for the data collector set. For example, you might enter Tableau Server Performance.

6. Select Create manually (Advanced) and then click Next.

7. Under Create data logs, select Performance counter, and click Next.

Step 2: Select performance counters

1. Set the sample interval to 30 seconds.

2. Click Add.

3. Select the computer that you want to record performance data for.
If you run Tableau Server on a single computer, select <Local Computer>. If you run Tableau Server on multiple computers, you must repeat some of these steps to gather data about each computer.

4. Select performance counters from the list.

The following table lists some performance counters that we recommend for tracking Tableau Server performance.

<table>
<thead>
<tr>
<th>Category</th>
<th>Performance Counters</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Disk</td>
<td>Current Disk Queue Length</td>
<td>The number of outstanding write requests and the amount of bytes read and written to the server’s hard disk. Select these counters for the disk on which you installed Tableau Server (referred to as the instance in PerfMon).</td>
</tr>
<tr>
<td></td>
<td>Disk Read Bytes/sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disk Write Bytes/sec</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>% Committed Bytes in Use</td>
<td>The percentage of virtual memory in use, and the amount of memory available in megabytes.</td>
</tr>
<tr>
<td></td>
<td>Available MBytes</td>
<td></td>
</tr>
<tr>
<td>Processor Information</td>
<td>%Processor Time</td>
<td>The percentage of time that the processor spends active, and the percent of processing capacity being used by the processor.</td>
</tr>
<tr>
<td></td>
<td>% Processor Utility</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>% Processor Time</td>
<td>The percentage of processing capacity being used by a particular process, and the amount of</td>
</tr>
<tr>
<td>Category</td>
<td>Performance Counters</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Private Bytes</td>
<td></td>
<td>memory reserved for the process. Select these counters for the following processes (referred to as <em>instances</em> in PerfMon):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• backgrounder <em>(Backgrounder)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• dataserver <em>(Data server)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• redis-server <em>(Cache server)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• tdeserver <em>(Data engine)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• vizqlserver <em>(VizQL Server)</em></td>
</tr>
</tbody>
</table>

To select each performance counter:

1. Double-click to select a category in the drop-down list.

2. Select the performance counter or counters that you want to use.

3. Under **Instances of selected object**, if appropriate, select the process (or instance) that you want to collect information about.
4. Click **Add**.

5. If you run Tableau Server on multiple computers, return to step 3, select another computer and then repeat the above steps.

**Important:** Depending on how you configured server processes to run across computers, you might have to monitor only a subset of the processes listed for each computer. For example, it's a best practice to isolate the backgrounder processes on a separate computer. As a result, for that computer, you would only monitor the backgrounder processes.

6. Click **OK** and then click **Next**.
Step 3: Save the data collector set

1. Browse to the directory where you want to store the data, and then click Next.

   **Important:** You must store the data in a place that’s accessible by Tableau. For example, you might want to store the data on a network drive. If you don’t have a network drive mapped, right-click This PC and select Add a Network Location.

2. Click Finish.

3. In the left pane of the main Performance Monitor window, select the data collector set that you created.

4. In the right pane, right-click the performance counter DataCollector01 and then click Properties.

5. Select Comma separated as the log format and then click OK.

Step 4: Run the data collector set

In the left pane, right-click the name of the data collector set that you created and click Start. The Windows Performance Monitor tool starts monitoring your server and storing information in the location that you specified.

Step 5: Allow Remote Access for Multiple Computers

For PerfMon to collect data about other computers, you need to make sure that the other computers can be reached—that is, that they are on the same network and do not have firewall rules that prevent access. The firewall rules that you need to set differ across versions of Windows, so you might need to contact your network administrator for information. In addition, you must make sure that the Run As user account has permission to collect data on the remote computers. By default, PerfMon runs the data collector set as the SYSTEM user. To change the Run As user, complete the following steps:
1. In the left pane of PerfMon, open the **Data Collector Sets** node and then the **User Defined** node.

2. Right-click the name of the data collector set and then click **Properties**.

3. In the **Run As** section of the **General** tab, click the **Change** button and specify a different account.

**Collect Data with the Tableau Server Repository**

Before you start analyzing the resource usage data that Windows Performance Monitor (PerMon) collects, connect to the Tableau Server repository to get additional data about load times and background tasks. The Tableau Server repository is a PostgreSQL database that stores data about all user interactions, extract refreshes, and more.

After you enable access to the Tableau Server repository, you can create views with data from the repository. The views that you create with this data are sometimes called custom administrative views. In addition to being used for performance monitoring, custom admin views can be used for tracking user activity, workbook activity, and more. For more information on the type of data that you can use for these views, see Create Custom Administrative Views. Alternatively, if you are only interested in performance data, you can use the preselected database tables in the sample performance workbook. For more information about the sample performance workbook, see Analyze Data with the Sample Performance Workbook.

**Get access to the Tableau Server repository**

You can use Tableau Desktop to connect to and query the Tableau Server repository using two built-in users. The user named **tableau** has access to several database views you can use as part of building your own analyses of Tableau Server activity. The user named **readonly** has access to additional database tables that you can use to create views for even more in-depth analysis.

**Use the readonly user to monitor Tableau Server.**
To access the Tableau Server repository, you need to enable access to the database by using tabadmin commands.

1. Open a command prompt as an administrator and type the following:
   
   ```bash
cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

2. Enter the following command to enable external access to the database for the **tableau user** or the **readonly user**:
   
   ```bash
tabadmin dbpass --username [tableau|readonly] password
   ```

   For example, to enable access for the **readonly user** with a password of `p@ssword`, use this command:

   ```bash
tabadmin dbpass --username readonly p@ssword
   ```

   **Note:** If no user is specified, the `dbpass` command enables access for the **tableau user**.

3. Restart Tableau Server by using this command:

   ```bash
tabadmin restart
   ```

   **Note:** If you later decide that you want to disable access to the Tableau Server repository, use the `tabadmin dbpass --disable` command. For more information, see `tabadmin Commands`.

Connect to the Tableau Server repository

This section describes how to connect to a custom set of tables from Tableau Server repository. If you want to use the sample performance workbook, see Analyze Data with the Sample Performance Workbook and follow the steps to edit the connection information.
1. In Tableau Desktop select **Data > Connect to Data**, and then select **PostgreSQL** as the database to connect to.

   **Note:** You might need to install the PostgreSQL database drivers. You can download drivers from [www.tableau.com/support/drivers](http://www.tableau.com/support/drivers).

2. In the PostgreSQL connection dialog box, enter the name or URL for Tableau Server in the **Server** box. If you have a distributed server installation, enter the name or IP address of the node where the repository is hosted.

   Connect using the port you have set up for the `pgsql.port`, which is 8060 by default. For more information about ports, see Tableau Server Ports.

   **Note:** The `tabadmin dbpass` command does not open any ports in the firewall. You may need to manually open the port in any firewall between your external client and the Tableau Server database.

3. Specify **workgroup** as the database to connect to.

4. Connect using one of the following users and the password you specified:

   **Username:** tableau or readonly.

   **Password:** The password you specified when you enabled access to the Tableau Server database for the specified user.

5. Click **Connect**.
6. Select one or more tables to connect to.

The **tableau** user has access to all of the tables that start with an underscore or with **hist_**. For example, you can connect to **_background_tasks** and **_data-sources**. The **hist_** tables include information about server users that isn’t currently presented in the Actions by Specific User view. The **readonly** user has access to additional tables that can be used to query other information about server usage.

7. Click **Go to Worksheet**.
Analyze Data with the Sample Performance Workbook

To get started analyzing the data that you collect with Windows Performance Monitor (PerfMon) and with the Tableau Server repository, you can download and use the sample performance workbook that Tableau provides. The sample workbook contains worksheets for some of the most important performance indicators, including CPU and memory utilization by process, disk activity, view load times, and more. After you download the workbook, use it as a starting point for your data exploration and extend it to meet your needs.

Download the sample performance workbook

1. In the workbook that's embedded below, click the Download button in the lower-right corner of the workbook.

2. Navigate to the directory where you downloaded the workbook and double-click on the workbook to open it in Tableau Desktop.

Edit the connections to the Tableau Server repository

After you open the workbook, you must edit the data connections to point to the PostgreSQL repository for your installation of Tableau Server.

The sample workbook includes the following data source connections:

- **Background Tasks**—a connection to the Tableau Server repository that joins the __background_tasks__ table and the __sites__ table.

- **Historical Events**—a connection to the Tableau Server repository that joins the __historical_events__, __hist_users__, and __historical_event_types__ tables.

- **Resource Usage**—a connection to the data you collect from PerfMon.

- **Sessions and Load Times**—a connection to the Tableau Server repository that joins the __users__, __http_requests__, __sessions__, and __sites__ tables.
1. From any of the sheets in the workbook, right-click the **Background Tasks** data source in the **Data** pane, and then click **Edit Data Source**.

![PostgreSQL Connection](image)

2. Replace the server address with the hostname or IP address of your server.

3. Enter the password that you set for the **readonly** user.

4. Click **OK**.

5. Repeat the steps above for the **Sessions and Load Times** data source.

**Edit the connection to the PerfMon data**

1. Click the **Data Source** tab.

2. In the data source list, select **Resource Usage**.

3. In the menu, click **Data > Resource Usage > Edit Connection**.
4. Navigate to the directory where you stored the data from PerfMon.

5. Select the file and click Open.

Replace references to PerfMon fields

Because the data that you collect from PerfMon includes references to specific host names, you must also replace the references in the workbook for specific field names. For example, when you click on the CPU worksheet, you might notice that most of the fields have a red exclamation mark next to them. This indicates that the field is missing from the new data source.

To map the fields in your data to the fields in the workbook, follow these steps:

1. Navigate to the CPU worksheet or to any of the worksheets that use the Resource Usage data source.

2. Right-click a field in the Measures list that has a red exclamation mark next to it.

3. Click Replace references.

4. Select the corresponding field in the dialog.

   For example, you might replace references to \YOUR-SERVER\LogicalDisk (C:)\Current Disk Queue Length.

Update calculations

The sample workbook includes calculations that aggregate processor utilization for multiple processes. To view data for all of the processes on your server, you must edit the calculations to include additional instances of server processes.

For example, the VizQL Server CPU % calculation includes a reference to one process:

[\YOUR-SERVER\Process(vizqlserver)\% Processor Time]

However, if your server runs more than one VizQL Server process, then you must aggregate the additional process in the calculation. For example, you might enter the following:
Publish to Tableau Server

Optionally, when you finish updating your performance workbook, you can publish it to Tableau Server so that the views in the workbook are accessible from the Tableau Server interface.

Performance Tuning

This section describes how to use the performance data that you collect to identify ways to improve the performance of Tableau Server. Because no two server environments are identical, we can’t provide hard and fast rules for tuning server performance. However, you can draw conclusions about performance from patterns in the data that you collected.

For example, are there recurring spikes? Do any of the patterns that you notice in the administrative views correspond to similar patterns in Windows Performance Monitor? Observing patterns like this can guide you in testing and incremental tuning.

Most performance tuning for Tableau Server boils down to these general approaches:

- **Optimize for user traffic.** This tunes the server to respond to user requests and to display views quickly.

- **Optimize for extracts.** This tunes the server to refresh extracts for published data sources. You might want to optimize for extract refreshes if your organization has a lot of data and the data needs to be as up to date as possible.

Rendering views and refreshing extracts generate the most load on the server, so you should optimize for the task that your organization is most interested in.

Optimize for User Traffic

You can optimize for traffic if you have many active Tableau Server users and few published data sources that need extract refreshes.
Note: This topic uses the sample performance workbook from the monitoring section. For more information, see Analyze Data with the Sample Performance Workbook.

- When to optimize for user traffic

- Ways to optimize for user traffic

When to optimize for user traffic

Slow load times for views

Use the Requests and Sessions dashboard of the sample performance workbook to analyze how long views take to load.

![Requests and Sessions](image)

If multiple views take longer than 10 seconds to load, and if the slow load times correspond to a large number of sessions, that can indicate that user traffic is slowing down the server.

However, if a particular view takes a long time to load regardless of when it is viewed, it’s a sign that the workbook for the view needs to be optimized. You can identify which workbooks need to be optimized with the Stats for Load Times administrative view. Some simple
ways of optimizing workbooks includes displaying less information in each view or breaking up views, reducing the number of filters, and using data extracts.

High resource usage corresponding to user traffic

If your server displays high CPU and memory usage during peak traffic hours, you should optimize for user traffic. To determine peak traffic hours and analyze how many concurrent users are on your server, use the **Users and Actions** dashboard. In addition, you can use the **Traffic to Views** administrative view to see how much user traffic involves accessing views (as opposed to performing administrative functions, publishing, or other tasks).

If you click a point in the **Number of Users** view, the dashboard displays the users that were active at the time and the number of user actions that those users performed. By default, the only user actions displayed are user views, but you can use the **Action Types** filter to display additional user actions.

Make a note of the times of day when there are many concurrent users and views so that you can compare this to resource usage. As a rule of thumb, the number of users should correspond to a high number of user actions. However, the view in this example displays an artificially high number of actions for a single user as part of a load generation test. As an
example, you can compare the high number of views at 12 AM on June 28th with the resource usage in the dashboard illustrated later.

Use the **CPU Usage** dashboard to display the percent of total CPU usage and the percent of CPU usage for each process. In the following example, note the large spike in total CPU usage and in the VizQL server process at 12 AM on June 28th. Because the VizQL server process loads and render views, the VizQL server process is often the first process to show strain under high user traffic.

**Note:** The percent of CPU usage for individual processes may add up to more than 100 percent. This is because processor utilization for individual processes is measured for a given processor core. By contrast, the total CPU usage is measured for all processor cores.

Use the **Memory Usage** dashboard to display the percent of total memory usage and the average memory usage in gigabytes. As a general rule, memory usage increases steadily with user traffic. Here again the VizQL server process is the first to show strain under high traffic.
Ways to optimize for user traffic

When high user traffic corresponds to high resource usage as it does in the example shown previously, you should optimize for user traffic.

Adjust the number of VizQL server processes

The most effective way of optimizing for user traffic is to adjust the number of VizQL server processes. Add one VizQL server process at a time and measure the effect with more performance monitoring. Because VizQL server processes can consume a lot of CPU and memory, adding too many processes can slow down the server instead. If you see consistently high memory usage, try to reduce the number of VizQL server processes to reduce the amount of memory reserved.

1. Stop Tableau Server and open the Tableau Server Configuration utility.

2. Click the Servers tab.

3. Click Edit.
4. Increase the number of VizQL server processes by one.

5. Restart Tableau Server.

Adjust the number of other processes

Although the most effective way of improving performance for user traffic is to adjust the number of VizQL server processes, you can also tune other processes that support the VizQL server process or that prevent the VizQL server process from accessing resources. For example, the VizQL server process makes frequent requests to the cache server process, so you might also want to increase the number of cache server processes. On the other hand, the backgrounder and data engine processes might contend for CPU resources with the VizQL server process. As a result, if you do not need to run frequent extract refreshes, you might reduce the number of processes for the backgrounder or the data engine. If you do need additional instances of these processes, and if you’re running Tableau Server on a cluster, you can move these processes to a dedicated node.

Adjust the VizQL session timeout limit

In the example shown previously, the amount of memory used by the VizQL server process increases with user traffic, and it remains reserved by Tableau Server for some time after the traffic finished. This is because the VizQL server process reserves memory for each session for a specified amount of time. If the VizQL server process uses a high percentage of the available memory, try reducing the timeout for each session to make memory available more quickly. To do this, use tabadmin to reduce the `vizqlserver.session.expiry.timeout` setting.

Refresh the cache less often

If your users do not always need the most up-to-date data, you can optimize for user traffic by configuring Tableau Server to cache and reuse data as much as possible.

1. Stop Tableau Server and open the Tableau Server Configuration utility.

2. Click the **Data Connections** tab.

3. Select **Refresh less often** as the caching option.
4. Click **OK**.

5. Restart Tableau Server.

Assess view responsiveness

When a user opens a view, the components of the view are first retrieved and interpreted, then displayed in the user’s web browser. For most views, the display rendering phase occurs in the user’s web browser and in most cases, this yields the fastest results and highest level of interactive responsiveness. Handling most interactions in the client web browser reduces bandwidth and eliminates round-trip request latencies. If a view is very complex, Tableau Server handles the rendering phase on the server instead of in the client web browser, because that generally results in the best performance. If you find that views aren't as responsive as you'd like, you can test and change the threshold that causes views to be rendered by the server instead of in the client web browser. For more information, see About Client-Side Rendering.

About Client-Side Rendering

When you navigate to a view in Tableau Server, the processing required to display the view (the rendering) can either be performed by your client web browser or by Tableau Server depending on the complexity of the view. The complexity of the view is determined by the number of marks, rows, columns, and more. If a view is less complex, then it is faster for you web browser to render the view than it is to send a request to Tableau Server. If a view is more complex, then it is faster to send a request to Tableau Server and take advantage of the server's computing power.

As a server administrator, you can configure when client-side rendering happens both for web browsers on your computer and web browsers on mobile devices by adjusting the complexity threshold. Alternatively, you can disable client-side rendering with tabadmin.

Requirements

- **Supported browsers**: Client-side rendering is supported in Internet Explorer version 9.0 or higher, Firefox, Chrome, and Safari. All of these web browsers include the
HTML 5 `<canvas>` element, which is used by client-side rendering.

- **Polygons and the page history feature**: If a view uses the polygon mark type or the page history feature, server-side rendering is performed, even if client-side rendering is otherwise enabled.

Configure the complexity threshold for computers and mobile devices

Because computers have more processing power than mobile devices, Tableau Server performs more client-side rendering in your computer’s web browser than in your mobile device’s web browser. You can adjust how much client-side rendering happens for computers and mobile devices with the complexity thresholds. You might want to adjust the complexity thresholds if you notice that views display slowly on mobile devices. Alternatively, you might want to increase the thresholds to reduce the number of requests to Tableau Server.

By default, the complexity threshold for computer web browsers is 100. To adjust the complexity threshold for computer web browsers, use the following `tabadmin` command:

```
tabadmin set vizqlserver.browser.render [new value]
```

By default, the complexity threshold for web browsers on mobile devices is 60. To adjust the complexity threshold for web browsers on mobile devices, use the following `tabadmin` command:

```
tabadmin set vizqlserver.browser.render_threshold_mobile [new value]
```

For example, to change the mobile threshold to 40, you might enter the following command:

```
tabadmin set vizqlserver.browser.render_threshold_mobile 40
```

For more information on how to use `tabadmin`, see `tabadmin`.

Disable client-side rendering

Client-side rendering is enabled by default and is recommended to improve the performance of views. However, you might want to disable client-side rendering temporarily for testing or
if your server is being accessed primarily by computers or mobile devices with very little processing power.

Use the following tabadmin command to disable client-side rendering:

```
tabadmin set vizqlserver.browser.render false
```

For more information on how to use tabadmin, see tabadmin.

Testing with the URL Parameter

To test server-side rendering on a session basis, type `?:render=false` at the end of the view’s URL. For example:

```
http://localhost/views/Supplies/MyView?:render=false
```

If client-side rendering is disabled on Tableau Server, enter `?:render=true` to enable it for the session:

```
http://localhost/views/Supplies/MyView?:render=true
```

You can also test particular complexity thresholds on individual views to see if it’s appropriate to adjust the server-wide threshold for your server and network conditions. For example, you may find that lower complexity (such as 80) or higher complexity (such as 120) tipping points result in more responsiveness to user interactions. To test a threshold, you can keep the server’s default configuration (client-side-rendering enabled) and enter the test threshold number at the end of the view’s URL. For example:

```
http://localhost/views/Supplies/MyView?:render=80
```

**Optimize for Extracts**

Try to optimize for extracts if the extract schedules correspond to high resource usage or if extracts take a long time to finish.
**Note:** This topic uses the sample performance workbook from the monitoring section. For more information, see Analyze Data with the Sample Performance Workbook.

- When to optimize for extracts
- Ways to optimize for extracts

When to optimize for extracts

High CPU usage corresponds to extract schedules

Use the **Background Jobs** dashboard of the sample performance workbook to view the number of background jobs run by Tableau Server, including extract refresh jobs. The dashboard also displays how long background jobs are delayed—that is, the amount of time between when a background job is scheduled and when it actually runs. If you see long delays at particular times of the day or if many jobs are running at the same time, try distributing the job schedules across different times of the day to reduce the load on the server.
Also compare the times when there are many background jobs or long delays with the CPU usage of the server. Use the **CPU Usage** dashboard to display the percent of total CPU usage and the percent of CPU usage for each process. Because the backgrounder process runs background jobs, it is the first process to show strain when there are many extract refresh jobs or when there are slow extract refresh jobs. Note that the CPU usage of the backgrounder process periodically but briefly reaches 100 percent. This indicates that there are intensive refresh jobs on a recurring schedule.

**Note:** The percent of CPU usage for individual processes may add up to more than 100 percent because processor utilization for individual processes is measured for a given processor core. By contrast, the total CPU usage is measured for all processor cores.
Extracts fail or run slowly

Use the Background Tasks for Extracts administrative view to determine how many extracts fail and how long extracts take to complete. Frequent failures can indicate a problem with a particular data source.
Ways to optimize for extracts

When high CPU usage corresponds to extract refresh schedules like it does in the example shown previously, you should optimize for extracts.

Adjust the extract refresh schedule

Use the **Background Jobs** dashboard of the sample performance workbook to identify optimal times for running extracts. In addition to running extracts in off-peak hours, you can distribute extract refreshes to minimize concurrent server load. If extract refreshes continue to cause problems, reduce the frequency of extract refreshes as much as possible in these ways:

- Schedule extracts for times when the server isn’t busy.
- Reduce the frequency of refreshes.
Speed up specific extracts

Use the Background Tasks for Extracts administrative view to identify failing extracts and long-running extracts.

- Reduce the size of extracts. You can help improve server performance by keeping the extract’s data set short, through filtering or aggregating, and narrow, by hiding unused fields. To make these changes, use the Tableau Desktop options **Hide All Unused Fields** and **Aggregate data for visible dimensions**. For more information, see Creating an Extract in the Tableau Desktop Help.

For general tips on building well-performing workbooks, search for “performance” in the Tableau Desktop Help. To see how workbooks perform after they've been published to Tableau Server, you can create a performance recording. For more information, see Create a Performance Recording.

- Use incremental refresh jobs. Incremental refresh jobs append new rows to an existing extract instead of creating the extract from scratch. This type of extract refresh runs quickly because it processes only the data that has been added since the last time the extract refresh job ran. However, it does not account for data that has been updated rather than appended to a data source. As a result, if you run incremental refresh jobs, you should still occasionally run full refresh jobs. For example, you might run a full refresh job once or twice a week for a data source instead of every day.

Configure the execution mode for extract refreshes

When you create extract refresh schedules, ensure that they run in parallel execution mode. When you run a schedule in parallel, it runs on all available backgrounder processes, even if the schedule contains only one refresh task. When you run a schedule serially, it only runs on one backgrounder process. By default, the execution mode is set to parallel so that refresh tasks finish as quickly as possible.

However, in some circumstances, it can make sense to set the execution mode to serial. For example, you might set the execution mode to serial if a very large job is preventing other schedules from running because it uses all available backgrounder processes.
Increase the number of backgrounder processes

A single background process can consume 100 percent of a single CPU core for certain tasks. As a result, the total number of instances you should run depends on the computer’s available cores. If you have Tableau Server installed in a cluster and you run backgrounder processes on a separate node, a good rule of thumb is to set the number of backgrounder process to between half the number of cores and the full number of cores of the computer running the backgrounder processes.

To increase the number of backgrounder processes, complete the following steps.

1. Stop Tableau Server and open the Tableau Server Configuration utility.
2. Click the Servers tab.
3. Click Edit.
4. Increase the number of Backgrounder processes by one.
5. Restart Tableau Server.

Isolate processes

If you have Tableau Server installed in a cluster, you see the largest benefit from moving the backgrounder processes to a separate node to avoid resource contention. This is because the backgrounder process is very CPU-intensive and running it on the same node where other CPU-intensive processes are running can slow down the server. For example, both the VizQL server process and the data engine process can be CPU-intensive.

When to Add Workers and Reconfigure

Tableau Server can scale up and out as your needs and requirements evolve. Here are some guidelines to help you figure out whether it’s time to add more worker nodes to your system, reconfigure the server, or both:
• **More than 100 concurrent users:** If your deployment is user-intensive (>100 simultaneous viewers), it’s important to have enough VizQL processes—but not so many that they exceed your hardware’s capacity to handle them. Also, enabling the Tableau Server **Guest User account** can increase the number of potential simultaneous viewers beyond the user list you may think you have. The administrative view can help you gauge this. For more information, see Actions by Specific User.

• **Heavy use of extracts:** Extracts can consume a lot of memory and CPU resources. There’s no one measurement that qualifies a site as extract-intensive. Having just a few, extremely large extracts could put your site in this category, as would having very many small extracts. Extract heavy sites benefit from isolating the data engine process on its own machine.

• **Frequent extract refreshes:** Refreshing an extract is a CPU-intensive task. Sites where extracts are frequently refreshed (for example, several times a day) are often helped by more emphasis on the background process, which handles refresh tasks. Use the Background Tasks for Extracts administrative view to see your current refresh rate.

• **Downtime potential:** If your server system is considered mission critical and requires a high level of availability, you can configure it so there’s redundancy for the server processes that handle extracts, the repository, and the gateway. For more information, see High Availability.

**Performance Tuning Examples**

This topic lists example process configurations for Tableau Server installations with one, two, and three nodes. Use these process configurations as a starting point when tuning the number of server processes in your installation of Tableau Server.

One-node example: Balanced

This example shows a 64-bit, 8+ core, 16+ GB system configured for heavy extract usage.
For this configuration, the **Process Status** table on the Server Status page would look like this:

![Process Status Table]

### Configuration notes

- The primary server runs two VizQL Server processes, two Cache Server processes, and two Data Server processes. These are the recommended values and are the defaults from installation.

- As a general rule, run a Cache Server process for every VizQL Server process on the node.

- Calculate the minimum number of Backgrounder processes to run by dividing the computer's total number of cores by 4. To calculate the maximum number, divide the computer's total cores by 2.

- Both the Backgrounder and Data Engine processes are CPU-intensive.

- Schedule extract refreshes for off-peak times to help the VizQL Server, Application
Server, Data Engine, and Backgrounder processes to not compete for system resources.

Two-node example: Optimized for heavy extract usage

This example shows a possible configuration for a two-node Tableau Server deployment that handles heavy extract usage. Both nodes are 64-bit, 8+ core, 16+ GB systems.

Note that the VizQL Server, Application Server, Data Server, and Data Engine processes on the primary node are isolated from the background processes, which are running on the worker node.

The **Process Status** table for this configuration would look like this:

![Server Status Table](image)

**Configuration notes**
• The primary node runs two VizQL Server processes, two Cache Server processes, and two Data Server processes.

• As a general rule, run a Cache Server process for every VizQL Server process on the node.

• Isolate the Backgrounder processes by configuring them to run on the worker node. To calculate the minimum number of Backgrounder processes to run, divide the computer's total number of cores by 4. To calculate the maximum number, divide the computer's total cores by 2.

• Isolate the Backgrounder processes from the VizQL Server, Application Server, Data Server, and Data Engine processes.

Two-node example: Optimized for user traffic

This example shows the configuration for a two-node deployment with light extract usage and heavier viewing. Both nodes are 64-bit, 8+ core, 16+ GB systems.

The Process Status table for this configuration would look like this:
Configuration notes

- The primary node runs two VizQL Server processes, two Cache Server processes, and two Data Server processes.

- As a general rule, run a Cache Server process for every VizQL Server process on the node.

- Isolate the Backgrounder processes by configuring them to run on the worker node. To calculate the minimum number of Backgrounder processes to run, divide the computer's total number of cores by 4. To calculate the maximum number, divide the computer's total cores by 2.

- Run Data Engine processes on both nodes to split view requests between the two nodes. In a deployment where extracts are refreshed infrequently, the Data Engine
and Backgrounder processes can be on the same node.

- If extract refresh jobs will be run only during off hours, you can add Backgrounder processes on each node to maximize the number of parallel jobs that can run at one time.

Three-node example: Optimized for a balance between extracts and user traffic

A configuration of three nodes or more is recommended to achieve the best performance when you have a high amount of extract refreshing and usage, and a high number of concurrent users. In this example, all computers are assumed to be 64-bit, 16 core, 16+ GB systems.

The **Process Status** table for this configuration would look like this:

![Process Status Table](image)

**Configuration Notes**
• For this configuration, 16 cores are recommended for each node.

  Run two VizQL Server processes, two Cache Server processes, and two Data Server processes on the nodes that are not running Backgrounder processes.

• As a general rule, run a Cache Server process for every VizQL Server process.

• The Backgrounder processes are on their own node so that they do not compete for resources with the other processes. Because this node is dedicated to Backgrounder processes and they might consume 100% of the CPU resources, the recommended number of Backgrounder processes is the number of cores divided by 2. However, for a more extract heavy environment, you might want to increase the number of Backgrounder processes to equal the number of cores for the node.

• Run Data Engine processes on the primary node and on the worker node that is not running Backgrounder processes. This allows Tableau Server to split view requests between the two nodes.

• The user loads for the Application Server and Data Server processes can typically be handled by a single instance of each process. However, you can configure two of each process to provide redundancy.

• Under most conditions, the primary Data Server processes and the Data Engine processes will not be a bottleneck for the system’s overall throughput as long as sufficient CPU cycles exist for them. To increase viewing capacity, add worker nodes and run dedicated VizQL Server processes on them. To increase capacity for refreshing extracts, add worker nodes and run dedicated Backgrounder processes on them.

Performance Recording

This section describes how to create performance recordings and use the results to improve workbook performance. With performance recordings, you can view how long workbook events take. For example, you can see how long it takes to connect to a data source, run a query, render data, and more.
Create a Performance Recording

The Performance Recording feature in Tableau records performance information about key events as you interact with a workbook. You can then view performance metrics in a workbook that Tableau creates to analyze and troubleshoot different events that are known to affect performance:

- Query execution
- Geocoding
- Connections to data sources
- Layout computations
- Extract generation
- Blending data
- Server blending (Tableau Server only)

Tableau support may ask that you create a performance workbook as they work with you to diagnose performance issues.

Enable Performance Recording for a Site

By default, performance recording is not enabled for a site. A server administrator can enable performance recording site by site.

1. Navigate to the site for which you want to enable performance recording.
2. Click **Settings**:

![Settings button in Tableau Server interface]

- 1140 -
3. Under Workbook Performance Metrics, select **Record workbook performance metrics**.

4. Click **Save**.

Start a Performance Recording for a View

1. Open the view for which you want to record performance.

   When you open a view, Tableau Server appends ":iid=<n>" after the URL. This is a session ID. For example:

   http://10.32.139.22/#/views/Coffee_Sales2013/USSalesMarginsByAreaCode?iid=1

2. Type **:record_performance=yes** at the end of the view URL, immediately before the session ID. For example:

   http://10.32.139.22/#/views/Coffee_Sales2013/USSalesMarginsByAreaCode?:record_performance=yes&:iid=1

3. Load the view.

   A visual confirmation that performance recording has started is the **Performance** option in the view toolbar:

   ![Performance option](image)

View a Performance Recording

1. Click **Performance** to open a performance workbook. This is an up-to-the-minute snapshot of performance data. You can continue taking additional snapshots as you
continue working with the view; the performance data is cumulative.

2. Move to a different page or remove :record_performance=yes from the URL to stop recording.

Interpret a Performance Recording

A performance recording workbook is a Tableau dashboard that contains three views: Timeline, Events, and Query.

For information on how to create a performance recording in Tableau Server, see Create a Performance Recording.

Timeline

The uppermost view in a performance recording dashboard shows the events that occurred during recording, arranged chronologically from left to right. The bottom axis shows elapsed time since Tableau started, in seconds.

In the Timeline view, the Workbook, Dashboard, and Worksheet columns identify the context for events. The Event column identifies the nature of the event, and the final column shows each event’s duration and how it compares chronologically to other recorded events:

Events

The middle view in a performance recording workbook shows the events, sorted by duration (greatest to least). Events with longer durations can help you identify where to look first if you
want to speed up your workbook.

Different colors indicate different types of events. The range of events that can be recorded is:

- Computing layouts

  If layouts are taking too long, consider simplifying your workbook.

- Connecting to data source

  Slow connections could be due to network issues or issues with the database server.

- Executing query

  - For live connections, if queries are taking too long, it could be because the underlying data structure isn’t optimized for Tableau. Consult your database server’s documentation. As an alternative, consider using an extract to speed performance.

  - For extracts, if queries are taking too long, review your use of filters. If you have a lot of filters, would a context filter make more sense? If you have a dashboard that uses filters, consider using action filters, which can help with performance.

- Generating extract

  To speed up extract generation, consider only importing some data from the original data source. For example, you can filter on specific data fields, or create a sample based on a specified number of rows or percentage of the data.
• Geocoding

To speed up geocoding performance, try using less data or filtering out data.

• Blending data

To speed up data blending, try using less data or filtering out data.

• Server rendering

You can speed up server rendering by running additional VizQL Server processes on additional machines.

Query

If you click on an Executing Query event in either the Timeline or Events section of a performance recording dashboard, the text for that query is displayed in the Query section. For example:

```
SELECT "State"."ID" AS "ID",
  "State"."Name" AS "State_Name",
  "ParentID" AS "State_ParentID"
FROM "StateSynonyms"
INNER JOIN "State" ON (("State"."ID" = "StateSynonyms"."ParentID") AND ("State"."MapCode" = "StateSynonyms"."MapCode")
```

If it makes sense, you can use the query text to work with your database team on optimizing at the database level. Sometimes the query is truncated and you’ll need to look in the Tableau log to find the full query. Most database servers can give you advice about how to optimize a query by adding indexes or other techniques. See your database server documentation for details.

Sometimes for efficiency, Tableau combines multiple queries into a single query against the data. In this case, you may see an Executing Query event for the Null worksheet and zero queries being executed for your named worksheets.
Performance Resources

This topic describes external resources that you can use to monitor and tune performance.

Disclaimer: This topic includes information about third-party products. Please note that while we make every effort to keep references to third-party content accurate, the information we provide here might change without notice. For the most up-to-date information, please consult the documentation for products referenced here.

- **TabJolt**. A load generation tool that you can use to understand how Tableau Server responds to user interactions over time. Use TabJolt to establish a baseline for server performance and test deployments before pushing them to production environments.

- **TabMon**. A monitoring tool that uses Windows Performance Monitor and Java Management Extensions to record performance data about Tableau Server to a PostGreSQL database.

- **Microsoft System Center**. A set of server management products for monitoring, configuration, automation, and more.

- **HP Sitescope**. An agentless application monitoring tool.

- **Zabbix**. An open-source, real-time monitoring tool.

- **Splunk**. A tool for monitoring and analyzing machine data, including logs.

- **Graylog**. An open-source log management tool.

Monitoring Tableau Server
Quick Start: Disk Space Alerts

You can configure Tableau Server to monitor free disk space on computers running Tableau Server, and to send alerts when free space drops below thresholds that you define. If you choose to have Tableau Server save historical usage information, this is available to Tableau Server administrators through one of the Administrative Views.

1 Configure SMTP

Before you can configure alerts for disk space usage, you need to configure Tableau Server for SMTP on the **SMTP Setup** tab in the Tableau Server Configuration utility.

![Tableau Server Configuration](image)

For more information about how to configure SMTP in Tableau Server, see Configure SMTP Setup.
2 (Optional) Change the historical disk usage data option

By default Tableau Server is configured to save data about disk space usage. If you do not want to save this data, clear the **Record disk space usage information, including threshold violations** box.

**Note:** You do not need to save disk space usage information to receive alerts about low disk space, but if Tableau Server is not saving disk space usage data, you cannot view historical disk space usage in Administrative Views.

3 Configure alerts

Tableau Server can send alerts to let you know when space on one of the Tableau Server nodes drops below the warning and critical thresholds of the entire disk. Tableau Server continues to send alerts at the frequency specified in **Send email alert every** as long as disk space remains below the warning threshold.
To receive email alerts when free disk space falls below either of the two thresholds, select

**Send alerts when unused drive space drops below thresholds:**

![Disk Space Monitoring](image)

4 Change alert thresholds and frequency

By default, the warning threshold is set to 20% and the critical threshold is set to 10%. As long as the free disk space remains below a threshold, Tableau Server will continue to send alerts at the frequency you specify in **Send email alert every**. You can change these values.

![Disk Space Monitoring](image)
Configure Server Alerts

On the **Alerts and Subscriptions** tab of the Tableau Server Configuration utility, you can configure the following server alerts:

- Email alerts for system failures
- Disk space usage:
  - Recording usage history
  - Email alerts when space crosses or remains below pre-configured thresholds

In the same part of the utility, you can also enable emails for subscriptions to views. For detailed information, see Set Up Subscriptions.

**Note:** You need to configure SMTP before you can configure subscriptions or alerts. For more information, see Configure SMTP Setup.

Alerts for system failures

Tableau Server can send email alerts to server administrators when there is a system failure.

When you configure alerts, Tableau Server sends an email to the recipients listed in **Send email to** on the SMTP Setup tab any time that the data engine, repository, or gateway server processes stop or restart, or any time the primary Tableau Server stops or restarts. If you are running a single-server installation (all processes on the same machine), health alerts are only sent when Tableau Server is up. No "down" alerts are sent. If you are running a distributed installation that's configured for failover (see Configure for Failover and Multiple Gateways), a DOWN alert means that the active repository or a data engine instance has failed and the subsequent UP alert means that the passive instance (repository) or second instance (data engine) of that process has taken over.
To configure email alerts for system failures

1. On the **Alerts and Subscriptions** tab of the Tableau Server Configuration utility, select **Send email alerts for server component up, down, and failover events**.

2. Click **OK**.

**Disk space monitoring**

If Tableau Server is configured to monitor free disk space and send alerts about low disk space, when space on any node in a server installation drops below the configured thresholds, Tableau Server sends an email to the recipients listed in **Send email to** on the **SMTP Setup** tab.

**Disk space usage**

When you configure Tableau Server to record disk space usage, information about free disk space is saved in the Repository and you can view the usage history using the Administrative Views.

To configure Tableau Server to record disk space usage

1. On the **Alerts and Subscriptions** tab of the Tableau Server Configuration utility, select **Record disk space usage information, including threshold violations**.
2. Click OK.

You can configure Tableau Server to send email alerts when disk space usage on any node crosses a threshold, or remains below the threshold.

To configure email alerts for low disk space

1. On the Alerts and Subscriptions tab of the Tableau Server Configuration utility, select **Send alerts when unused drive space drops below thresholds**.

2. In **Warning threshold**, enter the percentage of free disk space that Tableau Server should use a warning threshold.
If free disk space on any node in your Tableau Server cluster drops below this percentage, Tableau Server sends a warning alert email. Alerts continue until free disk space rises above the threshold. To configure the frequency of alerts, see Step 4 below.

3. **In Critical threshold**, enter the percentage of free disk that Tableau Server should use as a critical threshold.

If free disk space on any node in your Tableau Server cluster drops below this percentage, Tableau Server sends a critical alert email. Alerts continue until free disk space rises above the threshold. To configure the frequency of alerts, see Step 4 below.

4. **In Send email alert every**, enter the number of minutes for how often Tableau Server should send an alert.

5. Click **OK**.

### Configure SMTP Setup

Tableau Server can send email to alert system administrators if there is a system failure and can email subscriptions (snapshots of selected views) to system users. For this functionality to work, you need to first configure the SMTP server that Tableau Server uses to send email.

1. In the Tableau Server Configuration utility, click the **SMTP Setup** tab.

2. Under **SMTP Server**:
   
   a. Enter the name of your SMTP server.
   
   b. (Optional) If your account requires it, enter a user name and password for your SMTP server account.
   
   c. If you are not using the default SMTP port 25, change the SMTP port value.
d. Leave the **Enable TLS** box cleared so the connection to your mail server is unencrypted.

Encrypted SMTP connections are not supported for alerts or subscriptions.

![SMTP Configuration Screen](image.png)

3. For **Send email from**, enter the email address that will send an alert if there's a system failure. The email address must have valid syntax (for example, ITalerts@bigco.com or noreply@mycompany), but it does not have to also be an actual email account on Tableau Server.

   **Note:** Some SMTP servers may require this to be an actual email account. You can override the system-wide **Send email from** address on a per-site basis for subscriptions. For more information, see What is a Site?.

4. For **Send email to**, enter at least one email address that will receive the alerts. If you
enter multiple addresses, separate them with commas.

5. For **Tableau Server URL**, enter `http://` or `https://`, followed by the name or IP address of the Tableau server. This value will be used for the footer of subscription emails.

6. Click **OK**.

When you start the server it will trigger an email alert. This confirms that you have set up alerts correctly.

**Troubleshoot Disk Space Usage on Tableau Server Nodes**

When available disk space on a Tableau Server primary or worker node is low, performance can be degraded. If free space falls too low, Tableau Server may begin to perform erratically. To monitor free disk space, configure Tableau Server to save disk usage information (this is on by default) and, if desired, enable alerts about low disk space. For more information, see Quick Start: Disk Space Alerts.

**Note:** Disk space monitoring measures free disk space on each server node. Available space may be impacted by programs or processes that are not a part of Tableau Server.

If you find that your Tableau Server installation is running into free disk space limitations, you should take steps to make more space available. This topic suggests some ways you can do that.

**Viewing Disk Usage on Tableau Server Nodes**

When disk space usage monitoring is enabled (this is the default), server administrators can use the Server Disk Space administrative view to see current disk space usage, and one month of usage data on your Tableau Server nodes. Use this view to help you determine
whether one of your server nodes is experiencing a jump in space usage, or if space usage has increased over time.

**Cleaning Up Tableau Server-Related Files**

To minimize server space used by Tableau Server, you can clean up unnecessary files.

Use the `tabadmin cleanup` command to remove log files, temporary files, and unneeded entries in the PostgreSQL database. If you want to save the logs before you clean them up, you can make an archive. For more information, see Remove Unneeded Files.

Once you have cleaned up log files and temporary files, you may want to use the administrative views to determine which workbooks and data sources are taking up the most space on your server, and whether any of these is not being used. For more information, see Administrative Views.

**Identifying and Cleaning Up Other Files**

There are a number of tools, like WinDirStat, you can use for viewing disk usage and doing cleanup.

**Administrative Views**

The Status page contains an embedded Tableau workbook with various administrative views. These views help you to monitor different types of server or site activity.

- Shows server and site activity for Tableau Server.
- Shows site activity for Tableau Online.

**Navigating to administrative views**

To see administrative views, click Status. Site administrators can see administrative views for their site. Administrators of multiple sites can see views for the current site.
On a multi-site server, server administrators can see views for the entire server. Click the site menu, and then click **Manage All Sites** to access the server menus.

To see views for individual sites on a multi-site server, click the site menu, select the site name, and then click **Status**.

**Pre-built Administrative Views**

Administrative views are powerful monitoring tools that can help you optimize Tableau Server and better understand how your users are interacting with Tableau content. The administrative views listed to the right are included with Tableau Server. Click on the link for a view to learn more about how to interpret and act on the information the view provides.

To create your own administrative view, see Create Custom Administrative Views.

**Performance of Views**

*Note:* This view is only available to server administrators. For information about how to navigate to administrative views, see Administrative Views.

The Performance of Views administrative view displays how long it takes for views to load and how many sessions are running at a time on the server.
You can compare spikes in the number of sessions with spikes in slow load times to identify the times of day when high user traffic is slowing down the server. You can also look at the individual views by load time to understand which views take the longest to load. For information on how to optimize the server, see Optimize for User Traffic.

Some views might take a long time to load regardless of when they are viewed. You can identify which workbooks need to be optimized with the Stats for Load Times administrative view. Some simple ways to optimize workbooks includes the following:

- Display less information in each view.
- Break up views.
- Reduce the number of filters.
- Use data extracts.
Traffic to Views

The Traffic to Views view gives you the ability to see how much of your user traffic goes to views.

You can filter what information is displayed and the time frame it comes from by selecting the view, the workbook, and the time range. Server administrators can specify the site.

Two time lines at the top of the view show you how views are being used over a time range you specify (the default is the last 7 days):

- **What is the Total View Count by Day**—This shows total view count by day, based on the filters you set. Hover your mouse pointer over a point on the line to see the count of views. Select the point to update the other sections of the view based on your selection.

- **What is the Total View Count by Time**—This shows the view count by time of day. The filters and any selection impact this graph.
Two bar graphs at the bottom of the view show results that are filtered by the Min View Count filter at the top of the view. These show you the views that are most often accessed, and the users who most frequently access views Only those views and users with counts greater than or equal to the minimum view count value are displayed:

- **What Views are Seen the Most**—This is a list of the most visited views. Like the other sections of the view, the information is limited by filters and any selection you make.
- **Who Accesses Views Most Often**—This shows the users who most often access the views and is limited by filters and any selection you make.

Traffic to Data Sources

The Traffic to Data Sources view gives you the ability to see usage of data sources on your Tableau Server installation. This can help you determine which data sources are most heavily used and those that are less often used. You can filter the information you see by selecting the data source, the action taken on that data source, and the time range. Server administrators can specify the site.

A time line at the top of the view shows you how data sources are being used over a time range you specify (the default is the last 7 days):

- **What is the Total Data Source Usage by Day**—This shows total data source usage by day, based on the filters you set. Hover your mouse pointer over a point on
the line to see the count. Select the point to update the other sections of the view based on your selection.

Two bar graphs at the bottom of the view show results that are filtered by the **Min Inter-actions** filter at the top of the view. These show you which data sources are most used, and who uses data sources most often. Only those data sources and users with interaction counts greater than or equal to the minimum interactions value are displayed:

- **What Data Sources are Used Most**—This is a list of the most used data sources. Like the other sections of the view, the information is limited by filters and any selection you make.
- **Who Uses Data Sources Most Often**—This shows the users who most often use the data sources. This is impacted by filters and any selection you make.

**Actions by All Users**

The Actions by All Users view gives you insight into how your Tableau Server installation is being used. You can filter the view by actions and by time range. Server administrators can filter by site. The Total Users count shows the number of users who have performed an action. This value is not affected by any filtering. The Active user count shows the number of active users who have performed one of the selected actions.
Up to three separate groups of time lines show you how users are using Tableau Server over a time range you specify (the default is the last 7 days). If no actions are selected for a particular group, that group does not display. Possible groups are:

- **Access & Interactions**—This shows you sign in (log on) activity, view access and data source use.
- **Publish & Download**—This shows publishing and downloading of workbooks and data sources.
- **Subscriptions**—This shows counts of subscription email sent for workbooks and views.

Use the legend at the bottom to view a subset of the displayed actions. Click a single action to highlight the line for the action, or Ctrl + Click on multiple actions to highlight more than one. To clear the selection and display all the selected actions, click on any action in the legend.

**Actions by Specific User**

The Actions by Specific User view gives you insight into how individual users are working in your Tableau Server installation. You can filter the view by user name, actions, and time.
range. Server administrators on multi-site installations can filter by site.

Up to three separate groups of time lines show you how a selected user is using Tableau Server over a time range you specify (the default is the last 7 days). If no actions are selected for a particular group, or if no actions were taken, that group does not display. Possible groups are:

- **Access & Interactions**—This shows you sign in (log on) activity, view access and data source use.
- **Publish & Download**—This shows publishing and downloading of workbooks and data sources.
- **Subscriptions**—This shows counts of subscription email sent for workbooks and views.

A bar graph at the bottom of the view shows which items the selected user is using.

Use the legend at the bottom to view a subset of the displayed actions. Click a single action to highlight the line for the action, or **Ctrl + Click** on multiple actions to highlight more than
To clear the selection and display all the selected actions, click on any action in the legend.

**Actions by Recent Users**

The Actions by Recent Users view shows you which signed-in users have been active on Tableau Server recently. This can be useful if you need to perform some maintenance activity and want to know how many and which users this will affect, and what they are doing on Tableau Server.

The view **Active**, **Recently Active**, and **Idle** users that are currently signed in to Tableau Server. For this view, an active user is one who took an action in the last 5 minutes, a recently active user is one who last took an action within 30 minutes, and an idle user is one who last took an action more than 30 minutes ago. The actions are displayed in the lower section of the view.

Select a user to see only the actions that user performed recently. Hover over an action to see details of the action.
Background Tasks for Extracts

The Background Tasks for Extracts view displays extract-specific tasks that run on the server.

A table lists the extracts that ran in the time period specified in Timeline. Click **Success** or **Error** to filter the table based on status. Click a specific task to update the **How Much Time did Extracts Take** graph for the selected task. The **How Many Extracts Succeeded or Failed** table updates for the status (success or failure) of the task, but the count of extracts that succeeded or failed does not change.
Tasks can have a status of successful or error:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✳</td>
<td><strong>Error</strong>—Server was unable to complete the task.</td>
</tr>
<tr>
<td>✨</td>
<td><strong>Success</strong>—Server completed the task.</td>
</tr>
</tbody>
</table>

For details on a task, hover over its icon:

Background Tasks for Non Extracts

The Background Tasks for Non Extracts view displays tasks that the server runs that are not related to refreshing extracts. For example, edited OAuth connections, subscription notifications, and so on.
A table lists the tasks that ran in the time range specified. Click **Success** or **Error** to filter the table based on status. Select a specific task in the **How Many Tasks Succeeded or Failed on this Site** table to update the **What Background Tasks Ran on this Site** graph for the selected task.

Tasks can have a status of successful or error.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✴️</td>
<td><strong>Error</strong>—Server was unable to complete the task.</td>
</tr>
<tr>
<td>🏆</td>
<td><strong>Success</strong>—Server completed the task.</td>
</tr>
</tbody>
</table>

For details on a task, hover over its icon.
Background Task Delay

**Note:** This view is only available to server administrators. For information about how to navigate to administrative views, see Administrative Views.

The Background Task Delay view displays the delay for extract refresh tasks and for subscription tasks—that is, the amount of time between when they are scheduled to run and when they actually run. You can use the view to help you identify places you can improve server performance by distributing your task schedules and by optimizing tasks.

Here are possible reasons for the delays, and ways that you might reduce the delays:

- Many tasks are scheduled for the same time. In the example view, tasks that show long delays are clustered at the same time every day, which creates spikes in the wait
time. Note that you can set the **Timeline** filter to a single day to view task delays by hour and identify the hours of the day which have many tasks scheduled at the same time. A solution to this issue can be to distribute the tasks to off-peak hours to reduce load on the server.

- Specific tasks take a long time to run and are preventing other tasks from running. For example, there might be an extract refresh job that is connecting to a slow data source or that is processing a large amount of data. Use the **Background Tasks for Extracts** administrative view to identify which extract refresh tasks are running slowly. You can then optimize the extract refresh task by filtering the data, aggregating the data, or creating multiple data sources for individual tables in a data source.

- Other server processes are running at the same time and are consuming server resources and slowing down performance. Monitor the CPU and memory usage of server processes to see which processes are consuming the most resources and then adjust the configuration of processes on your server. For more information on monitoring processes, see Collect Data with Windows Performance Monitor. For more information on tuning the performance of server processes, see Performance Tuning.

**Stats for Load Times**

The Stats for Load Times view shows you which views are the most expensive in terms of server performance. You can filter by view and time range. Server administrators can filter by site. You can also limit the view based on load time in seconds, using the sliding Load Time filter. Load times are for the server. Depending on your client browser and networking, actual load time may vary slightly.

The **Average Load Times** graph shows average load times for views based on the filters you set. Hover over a point to see details. Select a point on the line to update the rest of the view for the selection:
The Exact Load Times view shows exact time to load the listed views. A vertical line shows the average load time for each view. Select a mark to see details of a specific instance of the view loading:

Stats for Space Usage

The Stats for Space Usage view can help you identify which workbooks and data sources are taking up the most disk space on the server. Disk space usage is displayed by user, pro-
ject, and by the size of the workbook or data source and is rounded down to the nearest number:

Three bar graphs give you information about space usage on your Tableau Server:

- **What Users Use the Most Space**—This shows the users who own data sources and workbooks that are taking up the most space. Click a user name to filter the next two graphs for that user. Click the data source bar or the workbook bar for a user to filter the next two graphs for that type of object for that user. Click the selected user or bar to clear the selection.

- **What Projects Use the Most Space**—This shows the projects with the data sources and workbooks that are using the most space. If a user or object type is selected in the What Users Use the Most Space graph, this displays information specific to the selection.

Use the **Min Size** filter to control which data sources and workbooks are displayed, based on the amount of space they take up.
What Workbooks and Data Sources Use the Most Space—This shows the workbooks and data sources that are taking the most space. The bars are color-coded based on the length of time since the last refresh.

Move your cursor over any bar to display usage details:

<table>
<thead>
<tr>
<th>User</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>cs</td>
<td>Default</td>
</tr>
<tr>
<td>admin</td>
<td>Default</td>
</tr>
<tr>
<td>fa</td>
<td>Default</td>
</tr>
</tbody>
</table>

Click on a bar to select it and update the other areas of the view based on that selection.

Server Disk Space

**Note:** This view is only available to server administrators. For information about how to navigate to administrative views, see Administrative Views.

Use the Server Disk Space view to see how much disk space is in use on the computer or computers that run Tableau Server, where disk space refers only to the partition where Tableau Server is installed. You can also use this view to identify sudden changes in disk space usage.

For a distributed installation, the view displays information about each computer in the cluster.
The Server Disk Space view includes two graphs:

- **What is the most recent disk space usage?**—This graph shows disk space usage for the last 30 days both in gigabytes and as a percentage. Disk space refers only to the partition where Tableau Server is installed.

- **How has free disk space trended in the last month?**—This graph shows changes to disk space usage over the last month. Rest your pointer on a line to view the exact amount of free disk space for a point in time.

When Tableau Server is low on disk space, you can remove files to free space.

For more information, see Troubleshoot Disk Space Usage on Tableau Server Nodes

**Tip:** You can have Tableau Server alert you when free disk space falls below a threshold that you specify. For more information, see Quick Start: Disk Space Alerts.
Desktop License Usage

**Note:** This view is only available to server administrators. For information about how to navigate to administrative views, see Administrative Views.

The Desktop License Usage view lets server administrators see usage data for Tableau Desktop licenses in your organization. This can help you manage licenses efficiently and determine if you need more or fewer licenses. This view can help you answer the following questions:

- Who is using a Tableau Desktop license in my enterprise?
- Have any licenses been shared or transferred?
- Is any license being used on a computer where it should not be?
- Does a specific user use their license?
- What types of licenses are being used in my enterprise?
- Do I need to convert any trial licenses?

**Note:** To get data about licenses, each copy of Tableau Desktop version 10.0 or later needs to be configured to send data to Tableau Server. This configuration can be done at installation time, using scripting or third-party software to install and configure Tableau, or after installation, by modifying the registry or property list file. For more information, see Configure Desktop License Reporting.

In order to view license data, Desktop License Reporting must be enabled on Tableau Server. See Enable and configure Desktop license reporting.

Filters

- **Product Keys.** Type a string to filter the dashboard to only those licenses that include
the string anywhere in the product key. For example, to see only licenses that begin with TDTD, type TDTD and press Return to filter the view. Click the X after the string to reset the filter.

- **Action.** Use this filter to control what the dashboard displays, based on the action taken. Actions are **Activate, Use, and Return.** If the **Use** action is not selected, nothing is displayed in the top bar graph.

- **Department.** Use this filter to control what departments the dashboard displays licenses for. The filter is populated based on the **Department** values specified when Tableau Desktop is registered.

- **Select time duration in days.** Use this slider to specify the time length in days that the dashboard displays information for. The default value is 183 days.

When you hover over the filter card in the first three filters, a drop-down icon appears. Click the icon to specify whether the view should include data that matches the filter (the default) or exclude data that matches the filter:

![Include values](image)

### Who has used Tableau in the last <nn> days?

This area of the dashboard shows a bar graph of three types of Tableau Desktop licenses (Perpetual, Trial, and Term) and the number of users who have used each license type during the specified time period. Hover over a license type segment to see an explanation of the license type. Click a segment to filter the rest of the dashboard for only that license type. This action filters both the tables that show licenses that have been used and those that have not been. For example, to see a list of term licenses that have been used during the time period, click the Term bar. The "used" and "not been used" lists are filtered to just show term licenses.
A table of detailed information shows under the bar graph. For each row in the table, action icons display on the right, above a timeline that shows you when the action last took place.

To see a list of the underlying data in a format that allows you to select and copy values like email or product key, click a row in the list of licenses and click the View Data icon:

![Keep only, Exclude, View Data icon]

The data displays in summary form. Click **Full data** to see all the data. From this view you can select and copy individual values, or download the data as a text file.

**What licenses have not been used in the last <nn> days**

This area of the dashboard shows a list of licenses that have not been used during the specified time period. A timeline shows the last use date. Hovering over a last use mark gives you information including the registered user of the copy of Tableau.

**Desktop License Expiration**

**Note:** This view is only available to server administrators. For information about how to navigate to administrative views, see Administrative Views.

The Desktop License Expiration view gives server administrators information about which Tableau Desktop licenses in your organization have expired or need maintenance renewal. This can help you manage licenses efficiently. This view can help you answer the following questions:

- What trial or term licenses have expired?
- What perpetual licenses have expired maintenance?
- What perpetual licenses have maintenance renewals coming up?
**Note:** In order to get data about licenses, each copy of Tableau Desktop version 10.0 or later needs to be configured to send data to Tableau Server. This configuration can be done at installation time, using scripting or third-party software to install and configure Tableau. For more information, see Configure Desktop License Reporting.

In order to view license data, Desktop License Reporting must be enabled on Tableau Server. See Enable and configure Desktop license reporting.

**Filters:**

- **Product Keys**—Type a string to filter the dashboard to only those licenses that include the string. For example, to only see licenses that begin with TDTD, type TDTD and press return to filter the view. Click the "x" after the string to reset the filter.

- **Department**—Use this filter to control what department(s) the dashboard displays licenses for. The filter is populated based on the Department values used when registering copies of Tableau Desktop.

- **Time Duration**—Use this filter to control the length of time for which the dashboard displays information.

The view includes the following tables, which are affected by the filters you set at the top of the view:

- **What keys have expired maintenance**—This table shows the product keys for which maintenance has expired, with a vertical line indicating the point at which the six month window for renewing maintenance closes. If maintenance for a key is expired for more than six months you need to purchase a new key in order to qualify for support or upgrades.

- **What trial and term licenses have expired**—This shows the trial or term product keys that have expired.
• What is the maintenance schedule for my keys—This shows the keys and their maintenance status.

Create Custom Administrative Views

In addition to the pre-built administrative views available on the Maintenance page on the Server, you can use Tableau Desktop to query and build your own analyses of server activity. To do this, you can connect to and query views in the Tableau Server repository using one of two built-in users: the "tableau" or "readonly" user.

To connect to the Tableau Server repository, see Collect Data with the Tableau Server Repository.

• The tableau user—The tableau user has access to special views and a subset of tables in repository database. These views and tables are provided so that administrators can create custom administrative views. Tableau makes an effort to limit changes to these tables and views so that custom views built with them do not break.

• The readonly user—The readonly user has access to a large number of the repository tables, providing more data about server usage. Administrators can use these to create custom administrative views too, but many of the tables are intended primarily to support the functioning of Tableau Server and may be changed or removed without warning. This means that views created from these tables can break when the database structure is changed.

Note: The readonly user is available in Tableau Server 8.2.5 and later.

For examples of using the readonly user to connect to the workgroup database, see the following articles in the Tableau Knowledge Base: Group Membership, Server Access, Server Access (2), and Workgroup Usage.

Before you can connect using one of the built-in users, you must enable access to the Tableau Server database. After doing this you can use Tableau Desktop to connect to and query the database as the tableau user or the readonly user.
The `tabadmin set auditing.enabled` option controls whether Tableau Server collects historical user activity and other information in the repository. It is enabled by default. Be aware that collecting historical events impacts the size of Tableau Server's backup file (`.tsbak`).

- All `hist_*` tables are controlled by the `tabadmin set wgserver.audit_history_expiration_days`, which controls how many days of event history are kept in the repository and has default value of 183 days.

- The `_http_requests` table is cleaned of all data older than 7 days every time `tabadmin cleanup` or `tabadmin backup` is used. For more information, see Remove Unneeded Files.

- The `_background_tasks` table is cleaned automatically and keeps data for the last 30 days.

- All other tables with names that begin with a "_" prefix contain current data.

## Maintenance

### Database Maintenance

A Tableau Server administrator should perform regular database maintenance, monitor disk usage on the server, and clean up unnecessary files to free up space on the server. Taking these steps can help ensure that Tableau Server runs with maximum efficiency.

You can use the `tabadmin` command line tool to back up and restore your Tableau data, and to clean up (remove) unnecessary log and temporary files. Tableau data includes Tableau Server's own PostgreSQL database, which stores workbook and user metadata, data extract (.tde) files, and server configuration data. Tableau Server log files capture activity and can help you diagnose problems. Logs are written to folders on the server and you can archive and remove them to save disk space. Use the commands described in the topics below, along with the built-in Windows task scheduler to automate backing up data and cleaning up unnecessary files.
Note: You can only use backups made with the `tabadmin backup` command when restoring Tableau Server data. Database backups made in other ways, and virtual machine snapshots are not valid sources for restoring Tableau Server.

Back Up Tableau Server Data

Backing up Tableau Server using the `tabadmin backup` command is an important part of proper administration and maintenance of your server. Only backups created with the `tabadmin backup` command can be used if you need to restore Tableau Server data.

The frequency of your backups depends on your environment, including how much use the server gets and how much and frequently the content and users change. Any changes or updates that happen after your backup will be lost if there is a system failure and you need to use the backup to restore Tableau Server. Keep this in mind when you determine how often you should be backing up your system.

In addition to your regular backups, you should always create a current backup of Tableau Server before upgrading to a new version.

Starting with Tableau Server version 9.3, an option to verify the integrity of the backup was included. Use this option to make sure there is no issue with the database that would result in your backup not being usable. For more information about the verify option, see Verify the Tableau Postgres Database.

Note: You should run `tabadmin backup` and other commands while logged in as the Run As user account for Tableau Server, or using an account that has administrative rights that include Modify permissions. For more information, see Run As Account Settings to Confirm in the Tableau Server Help.
Creating a regular backup

When you back up your Tableau data regularly, you can quickly restore published workbooks, data sources, and other information if there is a system failure. How often you create a backup depends on how heavily your Tableau Server is used. The more activity there is, the more often you need to back the server up.

Tableau Server data consists of Tableau's own PostgreSQL database, which contains workbook and user metadata, data extract (.tde) files, and configuration data. When you use tabadmin to create a backup, all these things are saved in a single file with a .tsbak extension. If you are running a distributed installation of Tableau Server you create the backup on the primary, and data from all the nodes is backed up.

For safety, after you create the backup, store the .tsbak file on a computer that is not a part of your Tableau Server installation.

**Note:** Running the `backup` command also removes Tableau Server log files older than seven days as well as some of the information displayed in certain Tableau Server Administrative Views.

1. Open a command prompt as an administrator and navigate to the bin directory. For example:
   
   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

2. Create a backup file by typing `tabadmin backup <filename>`, where `<filename>` is the name or location and name of your backup file. Beginning with version
9.3, include the \(-v\) option to verify the integrity of the backup.

Starting with version 8.1, there is no need to stop the server before you create the backup.

For example:

```
tabadmin backup tabserver -v
```

or

```
tabadmin backup C:\backups\tableau\tabserver -v
```

You can also optionally use \(-d\) to append the current date to the file name.

Add \(-t\) followed by a path, to specify a location for temporary files that are created during the backup process. The path for the temporary files is not the location where the backup file will be written. For example:

```
tabadmin backup tabserver -t C:\mytemp\tableau
```

In the above example, the backup file `tabserver.tsbak` will be created in the Tableau Server bin directory `(C:\Program Files\Tableau\Tableau Server\10.2\bin)` not in `C:\mytemp\tableau`.

**Note:** The \(-v\) option is available beginning with version 9.3 and verifies the integrity of the backup. After creating the backup, tabadmin verifies that the file can be used to restore the database. For more information, see Verify the Tableau Postgres Database.

Creating a pre-upgrade backup

You should always create a backup before upgrading Tableau Server. Starting with version 10.0, Tableau Server Setup offers to create a backup before upgrading to a new version. If you have created a backup yourself, before the upgrade, you can choose to skip this and save time during the upgrade. You can create a backup while Tableau Server is running and
minimize the amount of time the server is unavailable during upgrade. For more on the backup option during upgrade, see Tableau Server Upgrade Backup Options.

The process for creating a pre-upgrade backup is the same as for creating regular backups, with one additional consideration for distributed installations.

The Tableau backup file (.tsbak) includes configuration information as well as data. Therefore, a backup of a distributed installation of Tableau Server will include configuration information about the worker nodes, including their IP addresses. If you don’t want this information as part of your backup (for example, because you are creating the backup for a test deployment, or will be migrating worker nodes to new hardware as part of your upgrade), you can do one of two things:

- Plan on using the --no-config option when you restore the backup file to your new installation. With this option, no configuration information is restored, including configuration information for the primary Tableau Server node.

- Remove the workers from the Tableau Server configuration before creating the backup.

Note: You should uninstall Tableau Server from any workers that you are not including in your new installation to avoid conflicts between the older workers and the new installation.

Scripting the backup process

If you back up often, you might want to create a script that performs the backup and related tasks for you. These tasks include:

- Saving log files that are older than seven days if you do want to keep them, or conversely, removing log files that you don’t want to back up.

- Running the backup itself.
• Copying the backup file to a separate computer for safekeeping.

• Verifying that the server is running after the script is finished.

This section discusses `tabadmin` commands and Windows commands that you can use together to perform a backup and related tasks.

Save logs before cleanup

Performing a backup removes log files that are older than seven days. If you want to preserve the logs before the backup, run the following command before you start the backup:

```
tabadmin ziplogs -l -n -f
```

Remove log files and clear temporary folders

You can clean old log file and temporary files from your Tableau Server computer to reduce the time it takes to create a backup, and to ensure the backup file is as small as possible.

To clean log files older than a few days, run the following command:

```
tabadmin cleanup
```

If you run this command while the server is running, the command performs cleanup on log files and temporary folders that are not currently in use. To remove all Tableau Server log files and clear temp folders, stop the server first. This lets the cleanup command remove log files that might currently be open. The sequence of commands for a full cleanup is this:

```
tabadmin stop
tabadmin cleanup
tabadmin start
```

Run the backup

To create the backup, use the `tabadmin backup` command:

```
tabadmin backup <backupfilename> -d -v
```

Note the following about the command:
Include the -v command option to verify the integrity of the backup.

Add -d to the command to include the date in the file name.

For the <backupfilename> value, you can specify a path and filename if appropriate. If you specify only a filename, the backup file is saved in the current directory (the Tableau Server bin directory).

If you don’t specify a filename extension, Tableau adds the .tsbak extension.

Copy the backup file to another computer

As a best practice, after the backup is finished, copy the backup file and any saved log files to another location that is separate from Tableau Server. To do this, use the Windows copy command:

copy <original_backup_path_and_filename> <network_drive_or_other_location_path_and_name>

Verify Tableau Server restart

You can use script commands to verify that the Tableau Server is running after the backup process has completed and you’ve run a tableau start command. If the server does not start, you can have the script run a command that sends an email to the administrator. However, before checking the server status, allow enough time for Tableau Server to finish its initialization. You can do this in a script by including a timeout command in the script. In the following example, the timeout command waits 90 seconds before continuing:

timeout /t 90
if tabadmin status != 'RUNNING' then <code_to_email_an_alert>

Complete example script

The following is an example script combining logs, backup, cleanup and alerting capabilities.

tabadmin ziplogs -l -n -f
copy logs.zip <path_and_filename>
tabadmin backup <backupfilename> -d -v
copy <original_backup_path_and_name> <other_location_path_and_name>
tabadmin cleanup
timeout /t 90
if tabadmin status != 'RUNNING' then <code_to_email_an_alert>

Scheduling a scripted backup

To run backups regularly, you can use the Windows Task Scheduler to schedule when to run it.

1. Sign into Windows using the Run As user account or another account that has administrator permissions for the server computer.

2. Click the Windows Start menu and search for "schedule".

3. Right-click Task Scheduler and then click Run as administrator

4. Follow the Windows Task Scheduler wizard to complete the setup. As the command to run, specify the name of the command file that contains the backup script.

For more information, see Task Scheduler How To in the Microsoft TechNet library.

Verify the Tableau Postgres Database

Under rare circumstances, the PostgreSQL database that Tableau Server users for its repository can become corrupted. (If corruption occurs, it's often a result of a hardware problem on the computer hosting the repository.) The corruption may not be immediately obvious and may not cause the database to stop functioning, but it can impact your ability to restore a backup of the data.

To help you avoid problems due to database corruption, as a best practice you should regularly perform these tasks:

- Verify the integrity of the PostgreSQL database.
- Back up your Tableau data.
**Note:** The verify option is available beginning with version 9.3 of Tableau Server.

Verifying the database

You can verify database integrity while you perform a backup, or you can verify the database, or a backup of the database, as a separate step.

To verify the database during a backup, add the `-v` option to the backup command:

```
tabadmin backup tabserver -v
```

To verify the current database or a backup of the database, use the `verify_database` command:

```
tabadmin verify_database
```

**Note:** You do not need to stop Tableau Server to verify the database.

This command verifies that a backup of the PostgreSQL database can be restored successfully. If you cannot restore the database, your backups aren't useful, and Tableau Server upgrades can fail.

Verify the integrity of the Tableau PostgreSQL database using the procedure below.

1. Open a command prompt as an administrator and type the following:
   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```
   **Note:** If you are running a distributed installation of Tableau Server, perform this step on the primary computer.

2. Verify the current database or a backup of the database. You do not need to stop Tableau Server to verify the database.
Verify the integrity of the Postgres database by typing the following:

```
tabadmin verify_database
```

Verify the integrity of a backup file by typing the following:

```
tabadmin verify_database -f <filename>, where <filename> is the name of your backup file.
```

For example:

```
tabadmin verify_database -f c:\-
backups\tableau\tabserver\tserver.tsbak
```

Verify the integrity of the database while creating a backup of the Tableau Server data by adding `-v` to the backup command:

```
tabadmin backup tabserver -v
```

You can optionally specify a location for temporary files that are created during the verification process.

```
tabadmin verify_database -t C:\mytemp\tableau
```

If you don't specify a location, the default Tableau temp folder is used.

**Restore from a Backup**

Use the `tabadmin restore` command to restore your Tableau Server data. You might do this if you had a system failure and need to restore your data, if you need to switch back to a previous version of Tableau Server (for example, if there is a problem with an upgrade), or if you are moving Tableau Server to new hardware.

Only backups created using `tabadmin backup`, or created by the Tableau Server uninstall process can be used to restore Tableau Server data.

When you use `tabadmin` to restore your Tableau data, the contents of the PostgreSQL database, data extracts, and configuration files are overwritten with the content in the
backup file (.tsbak). If you are running a distributed installation of Tableau Server, perform the restore on the primary node.

**Note:** Beginning with version 9.3, a `verify_database` command allows you to verify that your backup file does not have a hidden problem that will cause the restore to fail. If you have version 9.3 or later, verify the integrity of the backup using the `tabadmin verify_database` command before you restore the database. For more information, see Verify the Tableau Postgres Database.

**Restore Tableau Server from a backup file**

1. Stop the server:
   ```
   tabadmin stop
   ```

2. Restore from a backup file:
   ```
   tabadmin restore <filename>
   ```
   In the above line, replace `<filename>` with the name of the backup file you want to restore from.

   **Note:** When restoring from a backup, Tableau Server prompts for the password of the Run As user account. You can type the password when prompted, or use a `.txt` file that contains only the password (if you are scripting the restore, for example).

   To restore only the data but no configuration settings (for example, if you are moving Tableau Server to a new computer), include the `--no-config` option:
   ```
   tabadmin restore --no-config <filename>
   ```

3. Restart the server:
tabadmin start

4. If you ran the `tabadmin assetkeys` command at any time before you created the backup file that you're now restoring, run the following command:

```bash
tabadmin assetkeys --validate
```

You'll be prompted to enter the passphrase needed to re-create the custom encryption keys in use in the backup file.

When you restore a `.tsbak` file, Tableau Server automatically creates a copy of its current data folder, names it `tabsvc.bak-*`, and places it in `ProgramData\Tableau\Tableau Server\data`. This folder is an emergency backup of Tableau Server data which Tableau Support may be able to use in case something goes wrong during backup restoration.

When the restore is complete and you have verified that Tableau Server is running correctly with all the expected data, it's safe to remove any `tabsvc.bak-*` folders from `ProgramData\Tableau\Tableau Server\data` to free additional disk space. In Tableau Server clusters, `tabsvc.bak-*` folders are created on each machine running Tableau Server.

**Important:** Only remove the `tabsvc.bak-*` folders. Do not remove the `tabsvc` folder, which is also located under `ProgramData\Tableau\Tableau Server\data`. It contains necessary Tableau Server data.

Providing the Run As user password in a file

**Note:** If you choose to store private information like passwords in a file, keep security considerations in mind. As a best practice we recommend you include a step in your process to remove the file after it is used to prevent unauthorized access.
When you restore from a backup, Tableau Server prompts you for the password of the Run As user account. If you are scripting the restore, you can provide the password in a `.txt` file that contains only the password.

For example, to restore to a new computer, use these commands:

```
tabadmin restore --no-config <backupfilename.tsbak> --password-file <passwordfile.txt>
tabadmin start
```

By default, Tableau Server looks in the `bin` folder for the password file. If you save the file in a different location, include the path for the file. For example:

```
tabadmin restore --no-config <backupfilename.tsbak> --password-file <c:\<location>\passwordfile.txt>
tabadmin start
```

### Recover Extracts from a Backup

The file `uninstall-<version>.tsbak` (for example, `uninstall-10.1.tsbak`) is created as part of the uninstall process. After you upgrade to version 10.2, you can use this file to restore data extracts—for example, if you mistakenly deleted the dataengine folder during the upgrade. To use `uninstall-<version>.tsbak` to restore data extracts:

1. Stop the server.

2. From within your version 10.2 Tableau Server `bin` directory, type the following:

   Windows Server 2012, Windows Server 2008, Windows 7, Windows 8: `tabadmin restore \ProgramData\Tableau\Tableau Server\uninstall-10.1.tsbak`
32-bit Tableau Server installed on 64-bit Windows Server: `tabadmin restore \Program Files (x86)\Tableau\Tableau Server\uninstall-10.1.tsbak`

32-bit Tableau Server installed on 32-bit Windows Server: `tabadmin restore \Program Files\Tableau\Tableau Server\uninstall-10.1.tsbak`

Remove Unneeded Files

As a best practice, you should monitor space usage on your server. If you need to make more space available, you can use the `cleanup` command to remove Tableau Server log files, temporary files, and unneeded entries in the PostgreSQL database. If you might need older logs for troubleshooting, you should create a log file archive before doing the cleanup. For more information, see Archive Logs on Command Line (tabadmin).

To perform a cleanup, use this command:

```
tabadmin cleanup
```

You can add the `restart` option, which is the equivalent of running `tabadmin stop, tabadmin cleanup, and then tabadmin start`:

```
tabadmin cleanup --restart
```

The files and database entries that are removed by `tabadmin cleanup` command depend on whether Tableau Server is running or stopped. Therefore, to clean up all possible files and database entries, you should run `tabadmin cleanup` twice: once when Tableau Server is running, and once when it is stopped. Here's a summary of what's removed when you run `tabadmin cleanup` with the server running and stopped.

**When you run `tabadmin cleanup` with Tableau Server stopped:**

- All log files are removed from `ProgramData\Tableau\Tableau Server-data\tabsvc\logs`. *(Log files from `ProgramData\Tableau\Tableau Server\logs` are not removed.)*
- Temporary files are removed from `ProgramData\Tableau\Tableau Server-temp` and `ProgramData\Tableau\Tableau Server\data\tabsvc\temp`.

- No rows for HTTP requests are removed from the `http_requests` table of the Tableau Server PostgreSQL database, because the database is not accessible when the server is stopped.

**When you run `tabadmin cleanup` with Tableau Server running:**

- Log files older than the log file rotation interval are removed from `ProgramData\Tableau\Tableau Server\data\tabsvc\logs`. *(By default, the rotation interval is one day.)* Active logs and log files from `ProgramData\Tableau\Tableau Server\logs` are not removed.

- Temporary files are not removed.

- Files that are in use (that is, locked by the operating system) are not removed.

- Rows for HTTP requests that are older than seven days are removed from the `http_requests` table of the Tableau Server PostgreSQL database.

**Note:** Rows for HTTP requests older than seven days are also removed when you back up Tableau data. For more information, see Back Up Tableau Server Data.

**More Information**

For more information about the Tableau Server PostgreSQL repository, see Collect Data with the Tableau Server Repository.

For tips on how to automate running the cleanup and backup commands, see Scripting the backup process.
If you have created a log file archive but you no longer need it, you can remove it from the server by using the **Delete Snapshot** option on the Status page. For more information, see Archive Logs on Status Page (Snapshot).

**Server Maintenance**

As an administrator, you will want to check the status of the server, analyze and monitor the activity on the server, manage scheduled tasks, or perform certain maintenance activities such as clearing saved data connection passwords. In addition, there are several settings that you may want to specify to customize the user experience for people using the server. You can do some of these tasks from the General page of the Status page and others from the Settings page.

**View Server Process Status**

You can use the Process Status table on the Server Status page to view the state of Tableau processes on each Tableau server:
Possible status indicators are listed at the bottom of the table:

When Tableau Server is functioning properly, most processes will show as Active, Busy or Passive (Repository):

- **Active**—The process is functioning as intended. See File Store in Troubleshoot Server Processes for details on possible active states.
- **Busy**—The process is completing some task. See File Store and Repository in Troubleshoot Server Processes for more information.
- **Passive**—The repository is in passive mode
- **Unlicensed**—The process is unlicensed.
- Down — The process is down. The implications of this differ depending on the process.
- Status unavailable — Tableau Server is unable to determine the status of the process.

If there is additional information, a message appears below the status icon:

![Ready for removal]

For more information about troubleshooting process status, see Troubleshoot Server Processes.

Access Status Remotely

You must be a Tableau Server administrator to see the Server Status page, but you can grant remote access to other computers to allow access to a machine-readable (XML) version of the Status table by non-admin users and by computers other than the primary Tableau Server node. One reason you might do this is as part of a remote monitoring process.

To grant remote access to Tableau Server status:

1. Open a command prompt as an administrator and type the following:
   
   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

2. Enable remote access by typing the following:
   
   ```
   tabadmin set wgserver.systeminfo.allow_referrer_ips <ip address>
   ```

   In the above command, `<ip address>` is the IPv4 address of the computer for which you want to enable remote access to the Tableau Server status XML.

   For example:
tabadmin set wgserver.systeminfo.allow_referrer_ips 10.32.139.31

If you are enabling remote access for more than one computer, use commas to separate each IP address.

tabadmin set wgserver.systeminfo.allow_referrer_ips 10.32.139.31,10.32.139.35

3. Commit the configuration change:

   tabadmin config

4. Restart Tableau Server:

   tabadmin restart

Now, users of computers with the IP addresses that have been added can view Tableau process status by entering the URL http://<server->/<admin/systeminfo.xml in a browser or from a command line (for example, curl http://jsmith/admin/systeminfo.xml).

For details on the XML that is returned, see Get Process Status as XML.

Get Process Status as XML

To get a machine-readable version of the server process status, that is, a version of the status formatted in XML, use the following URL:

http://my_tableau_server/admin/systeminfo.xml

You must be signed in to Tableau Server to view the machine-readable process status, or have enabled remote access.

The server returns a status report similar to the following:

<systeminfo xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <machines>
<machine name="my_tableau_server">
    <repository worker="my_tableau_server:8060" status="Active" preferred="false"/>
    <dataengine worker="my_tableau_server:27042" status="Active"/>
    <applicationserver worker="my_tableau_server:8600" status="Active"/>
    <apiserver worker="my_tableau_server:8000" status="Active"/>
    <vizqlserver worker="my_tableau_server:9100" status="Active"/>
    <dataserver worker="my_tableau_server:9700" status="Active"/>
    <backgrounder worker="my_tableau_server:8250" status="Active"/>
    <gateway worker="my_tableau_server:80" status="Active"/>
    <searchandbrowse worker="my_tableau_server:11000" status="Active"/>
    <cacheserver worker="my_tableau_server:6379" status="Active"/>
    <filestore worker="my_tableau_server:9345" status="Active" pendingTransfers="0" failedTransfers="0" syncTimestamp="2015-02-27T20:30:48.564Z"/>
    <clustercontroller worker="my_tableau_server:12012" status="Active"/>
    <coordination worker="my_tableau_server:12000" status="Active"/>
</machine>
</machines>
<service status="Active"/>
</systeminfo>
Status values in the XML

- `<process>` **worker** - The name of the node running the process and the port the process is using.

- **status** - The status of the process on the node. Possible values are: **Active**, **Passive**, **Unlicensed**, **Busy**, **Down**, **ReadOnly**, **ActiveSyncing**, **StatusNotAvailable**, **StatusNotAvailableSyncing**, **NotAvailable**, **DecommisionedReadOnly**, **DecomisioningReadOnly**, and **DecommissionFailedReadOnly**

- **pendingTransfers** - A count of the workbook or data source extracts the node needs to get to be fully synced. These represent items that were published to this file store node, and items that were published to other file store nodes and need to be copied to this node.

- **failedTransfers** - A count of the workbooks or data sources that did not transfer successfully to this file store node during the last automated job. The automated job normally runs about every 15 to 30 minutes, but may take longer when transferring a large number of extracts or large extracts.

  Failed transfers do not necessarily indicate a problem with Tableau Server. The recurring automated job will normally transfer files that failed during the previous sync. Reasons for failed file transfers are listed in the logs.

- **syncTimestamp** - The time in UTC of the last automated job that ran and synchronized files.

Troubleshoot Server Processes

When Tableau Server is functioning properly, processes will show as **Active**, **Busy** or **Passive (Repository)**. If there is additional information, a message appears below the status icon:
Possible status indicators are:

The following sections provide troubleshooting recommendations for status messages that you may see.

Cluster Controller

This message will only display if you have more than two nodes.

**Status: Down; Message: "Node degraded"**

One or more of the following are true:

- Repository on the node is stopped.
- Node cannot respond to failover elsewhere on the cluster.
- If Tableau Server is configured for high availability and this is the active repository, failover to the second repository occurs.
- No status available for repository or file store on this node.

No action is necessary unless the cluster controller is regularly down or is down for an extended period of time.

If that occurs, take the following actions, in order, until the problem is resolved:

1. Check disk space. If disk space is limited, save the log files (use `tabadmin zip-logs`) in case you need them for Support, then remove unnecessary files (tabadmin cleanup).
2. In Windows Task Manager, stop the clustercontroller.exe process tree and let it restart automatically.
3. Restart Tableau Server.
4. Clean up the coordination service (ZooKeeper) files: Stop the cluster (`tabadmin stop`), clean up files (`tabadmin cleanup --reset-coordination`), and then start the cluster (`tabadmin start`).

5. If Cluster Controller continues to show as down, save the log files (`tabadmin zip-logs`) and contact Support.

File Store

File Store status only reflects the state of the file store when the page was loaded.

An active status (✓) with no message indicates that no extracts were being synchronized when the page was loaded. It is possible that the recurring "catch-all" job is running and synchronizing extracts.

🌐 Status: Busy; Message: "Synchronizing"

"Synchronizing," usually indicates that extracts were being synchronized across file store nodes when the page was loaded.

However, the "synchronizing" message is also returned following installation (both single-node and multi-node). After Tableau initializes the status should disappear within 15 or 20 minutes.

🚫 Status: Down; "Data Extracts unavailable"

On a single-node installation: "Data Extracts unavailable" indicates that existing extracts may be available but publish/refresh will fail. On multi-node installations, this message indicates that extract synchronization will fail for this node.

No action is necessary unless the file store is regularly down or is down for an extended period of time.

If that occurs, take the following actions, in order, until the problem is resolved:

1. Check disk space. If disk space is limited, save the log files (`tabadmin ziplogs`) in case you need them for Support, and then remove unnecessary files (`tabadmin cleanup`).
2. Stop the filestore.exe process using Windows Task Manager and let it restart automatically.
3. Restart Tableau Server.
4. Clean up the coordination service (ZooKeeper) files: Stop the cluster (tabadmin stop), clean up files (tabadmin cleanup --reset-coordination), and then start the cluster (tabadmin start).
5. If the file store continues to be down, save the log files (tabadmin ziplogs) and contact Support.

**Status: Busy; "Decommissioning"**

This message indicates that this File Store is in read-only mode and that any unique files on this node are being replicated to other file store nodes.

To remove this node, wait until the status message changes to "Ready for removal".

**Status: Active; "Ready for removal"**

This message indicates that the File store is in read-only mode.

You can safely stop (tabadmin stop) the cluster and remove Data Engine and/or File Store processes, or remove entire node.

**Status: Active; "Decommission failed"**

This message indicates that the File store is in read-only mode, and that at least one unique file failed to replicate to another file store node.

To resolve a failed decommissioning:

1. Run the tabadmin decommission command again.
2. Check disk space on other file store nodes. Decommissioning will fail if another file store node does not have enough space to store all the extracts.
3. Check the tabadmin.log file on the primary node and workers for errors.
4. Stop Tableau Server (tabadmin stop) and then try running the tabadmin decommission command again.
5. Put the file store node back into read/write mode (tabadmin recommission), collect logs, and then contact Support.

6. With Support: copy and merge extracts directory from this file store node to the same directory on another file store node.

Repository

**Status: Busy; Message: "Setting up"

The "Setting up" message indicates one or more of the following states:

- Passive repository is being synchronized with active repository.
- Repository is not ready to handle failover.
- Repository may have gotten more than two minutes behind active repository and is being setup again (this is faster than waiting for a sync).
- Failover occured and this former active repository is rejoining the cluster.

Wait until the repository status message changes to "Passive".

If this message does not appear, or if it is taking a long time:

1. Check disk space and free space if possible.
2. Check cluster controller logs for errors.
3. Restart node.

**Status: Busy; Message: "Synchronizing"

Repository is synchronizing, for example after a failover.

**Status: Down; Message: n/a

When the Repository shows a status of down and there is no message, then the Repository is in one of the following states:

- If the installation is configured for high availability, failover of the repository occurred.
- Processes are restarting with updated database connection configurations after failover.
- If another active repository is not available, Tableau Server is down.

Take these actions in the given order until the problem is resolved:
1. Wait several minutes for cluster controller to attempt to restart.
2. Restart Tableau Server (tabadmin restart).
3. Check disk space to make sure there is free space. Collect logs (tabadmin zip-logs) in case you need them for Support, and then cleanup files (tabadmin cleanup).
4. Restart Tableau Server.
5. Stop Tableau Server, collect logs and cleanup coordination service files (tabadmin cleanup --reset-coordination)
7. Collect logs (tabadmin ziplogs) and contact Support.

✓ Status: Passive; Message: n/a

A passive status with no message indicates that the node is working as intended and that it is ready for failover if needed.

VizQL Server

⚠️ Status: Unlicensed; Message: n/a

For information about unlicensed status for a VizQL Server process, see Handle an Unlicensed VizQL Server Process.

Archive Logs on Status Page (Snapshot)

You can generate and download a snapshot (archive) of the Tableau Server log files from a web browser, without opening a command prompt. This zipped snapshot contains a copy of up to seven days of log file data from Tableau Server and any worker servers (if you have a distributed environment). The snapshot process does not change or remove either the Tableau Server log files or the log archives created with tabadmin.

Note To specify the amount of data you want to collect or the name of the zip file you are creating, use tabadmin to create an archive of server logs. For more information, see Archive Logs on Command Line (tabadmin).
To generate a snapshot of server log files:

1. Open the Status page:

   - Multi-site: Select **Server > Status**.
   - Single-site: Select **Status**.

2. Click **Generate Snapshot** to create a snapshot of the Tableau Server logs. The Generate Snapshot button is available only if there is no existing snapshot.

   **Note:** This option is available whether or not you have created log archives with tabadmin.

3. Select the number of days of logs you want to include. The default is **Last 7 days**, but you might want to select fewer if you want to reduce the size of the zip file. If you are collecting logs after reproducing an issue, include at least three days worth of logs.

4. Click **Download Snapshot** to download the log snapshot to your web browser’s default download location. This option is available after you create a snapshot.

   Google Chrome shows you the download in the bottom of the window:
5. Click the arrow and then click **Open** to unzip the snapshot or **Show in folder** to see where it was downloaded:

6. (Optional) Click **Delete Snapshot** to delete a log snapshot. This option is available after you create a snapshot. You need to delete the existing snapshot before you can create a new one.
For example, you might want to delete the snapshot that you created before an event that you want to investigate.

**Uploading log archives for Tableau Support**

If you are creating the archive to send to Tableau Support, see the Knowledge Base for information about how to upload large files.

**Rebuild the Search Index**

If search is returning incomplete or incorrect results, or if the Search & Browse process is down for an extended period of time, you may need to rebuild the search index.

**Important:** The recommended way to reindex search is to use the `tabadmin rein dex` command while Tableau Server is stopped. Reindexing while the server is running can result in content, including sites and projects, temporarily disappearing from server pages.

The search index is built or rebuilt at key points during installation or upgrade of Tableau Server, when you restore a backup, and when you add the Search & Browse process to a new or existing node. The index is kept updated by a background task when content changes. If necessary you can force a rebuild of the index using the `tabadmin rein dex` command.
1. To rebuild the search index, click **Status**.

![Tableau Server Status](image)

In a multi-site environment, select **Server > Status**.

2. At the bottom of the page, click **Rebuild Search Index**.

![Rebuild Search Index](image)

**Note:** You might not see all available server content while the index is rebuilding, and larger search indexes can take longer times to finish rebuilding. Reindexing first removes all content from the index, and then re-adds the content to the index. If you do this while Tableau Server is running, users who are logged into the server will see content disappear, and then slowly start to reappear in server pages. Reindexing while Tableau Server is stopped provides a better user experience.

**Clear Saved Data Connection Passwords**

As the administrator, if you enable the Allow users to save data source passwords setting, server users can save data source passwords across multiple visits and browsers so they are no prompted for their credentials each time they connect to a data source.

You can reset the data source passwords for all Tableau Server users. Doing this forces them to sign in to the data sources the next time they visit a view that requires database authentication. Server users can also clear their saved data connection passwords on an individual basis using their User Preferences page.
To clear saved data connection passwords for all server users:

1. In a site, click **Settings > General**.

   ![Tableau Settings General](image)

2. Under Saved Credentials, click **Clear All Saved Credentials**.

   ![Saved Credentials](image)

Synchronize All Active Directory Groups on the Server

As a server administrator, you can synchronize all Active Directory groups on a regular schedule or on-demand on the **General** tab of the **Settings** page for the server.
The **Last synchronized** time indicates the time that synchronization most recently began.

Synchronize Active Directory groups on a schedule

1. **Single-site**: Click **Settings > General**.

   **Multisite**: In the site menu, click **Manage All Sites** and then click **Settings > General**.

2. Scroll down the page to **Active Directory Synchronization**, and then select **Synchronize Active Directory groups on a regular schedule**.
3. Select the frequency and time of synchronization.

4. Click **Save**.

**Synchronize all Active Directory groups on demand**

At any time, you can synchronize Active Directory groups with Tableau Server to ensure that new users and changes in Active Directory are reflected in all Active Directory groups on Tableau Server.

1. **Single-site**: Click **Settings > General**.

   **Multisite**: In the site menu, click **Manage All Sites**, and then click **Settings > General**.
2. Under Active Directory Synchronization, click Synchronize All Groups.

View synchronization activity

You can view the results of synchronization jobs in the Background Tasks for Non Extracts administrative view. Queue Active Directory Groups Sync is the task that queues and indicates the number of Sync Active Directory Group tasks to be run.

1. **Single-site**: Click Status.

   **Multisite**: In the site menu, click Manage All Sites and then click Status.

2. Click the Background Tasks for Non Extracts link.

3. Set the Task filter to include Queue Active Directory Groups Sync and Sync Active Directory Group.

You can quickly navigate to this administrative view by clicking the View synchronization activity link in the Settings page for the server.

Set the minimum site role for users in an Active Directory group

In the Groups - Details page, you can set the minimum site role for group users to be applied during Active Directory synchronization.
This setting does not run synchronization; instead, it sets the minimum site role to applied to the group every time synchronization runs. The result is that when you synchronize Active Directory groups, new users are added to the site with the minimum site role. If a user already exists, the minimum site role is applied if it gives the user more access in a site. If you don’t set a minimum site role, new users are added as Unlicensed by default.

**Note:** A user’s site role can be promoted but never demoted based on the minimum site role setting. If a user already has the ability to publish, that ability will always be maintained. For more information on minimum site role, see Site roles and Active Directory import and synchronization.

1. In a site, click **Groups**.

2. On the Groups page, select a group.

   Click **Actions > Minimum Site Role**.

3. Select the minimum site role, and then click **Change Site Role**.
What happens when users are removed in the source Active Directory?

Users cannot be automatically removed from the Tableau Server through an Active Directory sync operation. Users that are disabled, deleted, or removed from groups in Active Directory remain on Tableau Server so that administrators can audit and reassign the user's content before removing the user's account completely. For more information, see Sync behavior when removing users from Active Directory.

Set the Default Start Page for All Users

By default, Tableau Server installs with the Views page as the default start page for all users. As the administrator, you can change this to another page that all users have access to, such as the Workbooks page. Individual users will be able to override your setting (search for "Access Your Profile and Account Settings" in the Tableau Server Help for details).

To set the default start page for all users

1. Navigate to the page you want to be the default page.
2. Click your name on the upper right corner of the page.
3. Select Make This the Start Page for All Users.

Disable Automatic Client Authentication

By default, after Tableau Desktop clients first successfully sign in to Tableau Server, they are automatically authenticated in the future. As a Tableau Server administrator, however,
you can disable automatic authentication.

To immediately disconnect all clients from Tableau Server and require users to sign in every time they connect:

1. In the site menu, click **Manage All Sites**, and then click **Settings > General**.

2. Under **Connected Clients**, clear the option **Allow clients to automatically connect to Tableau Server**.

3. Click **Save**.

**Tableau Server Monitor**

Tableau Server Monitor is installed as part of Tableau Server and can be accessed in the Windows system tray.

Using this tool you can start and stop the server, open Tableau Server, and display server status.

**Open the Server**

This command launches Tableau Server in your web browser. This is an easy way to access the web application and the associated maintenance tools.
Start/Stop the Server

You can start and stop the server using these commands. When you stop the server you make it unavailable to all of your users and terminate any sessions that are currently in progress. If someone is publishing a workbook when the server is stopped, the process is abandoned. As a result, only some of the worksheets in the workbook may be published to the server. Because stopping the server can be very disruptive to your users, be sure to warn them prior to this operation or plan maintenance during non-business hours.

Restart the Server

This command restarts the server. While the server is restarting it will be unavailable to all users. Be sure to warn your users of the outage prior to this operation. You will need to restart the server if you make changes to the Tableau Server configuration.

Display Status

This command opens a screen tip containing the status of each process. For more detailed status, use the Maintenance page.

Manage Product Keys

This command opens the product key manager where you can add and remove product keys.

Exit

This command closes Tableau Server Monitor. It does not stop Tableau Server. You can re-open the application by selecting All Programs > Tableau Server 10.2 > Tableau Server Monitor on the Windows Start menu.

Server Settings (General)

The following settings are available on the General page in Server - Settings.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embedded Credentials - Allow pub-</td>
<td>Allows publishers to attach passwords to pub-</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Publishers to embed data source credentials in a workbook</strong></td>
<td>Published workbooks that will automatically authenticate web users to connect to data sources. The passwords are attached to workbooks and are only accessible on server. That is, when the workbook is opened in Tableau Desktop, users will still need to enter a user name and password to connect to the data source. When this setting is turned off, all existing embedded passwords are saved but are not used for authentication. If you turn the setting back on, users don’t have to re-embed the passwords.</td>
</tr>
<tr>
<td><strong>Embedded Credentials - Allow publishers to schedule data extract refreshes</strong></td>
<td>Allows publishers to assign workbooks to schedules. This option is only available if <a href="#">Allow publishers to embed data source credentials in a workbook</a> is enabled. When this setting is enabled, publishers will see scheduling options in the Publish dialog box.</td>
</tr>
<tr>
<td><strong>Saved Credentials - Allow users to save data source passwords</strong></td>
<td>Allows users to save data source passwords across multiple visits and browsers. By default users can choose to &quot;Remember my password until I sign out,&quot; which lets them save their password during a single browser session. When the Saved Passwords setting is selected a user can instead choose Remember my password, which saves the password across multiple visits and browsers so users will be automatically authenticated regardless of the computer they are using. You, as an administrator, can clear all saved passwords at any time. In addition, users can clear their own saved passwords.</td>
</tr>
<tr>
<td><strong>Saved Credentials - Allow users to</strong></td>
<td>Allows users to store access tokens with their</td>
</tr>
</tbody>
</table>

- 1216 -
<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>save data source access tokens</td>
<td>User preferences. Access tokens are provided by cloud data sources that support OAuth connections, and they are used instead of user names and passwords to grant access to the data. For more information, see OAuth Connections.</td>
</tr>
<tr>
<td>Connected Devices - Allow devices to automatically connect to Tableau Server</td>
<td>Controls whether mobile users must sign in and provide their credentials every time they connect to Tableau Server, or if users can connect with their devices to Tableau Server without providing credentials after they authenticate their device successfully the first time. For more information, see Disable Automatic Client Authentication.</td>
</tr>
<tr>
<td>Guest Access - Enable Guest account</td>
<td>Allows users to view and interact with embedded views without having to sign in to a Tableau Server account. Permission can be assigned to the Guest User account to control the interactivity allowed for each view. This option is only available if you have a core-based server license. This option can be used with Enable automatic logon, an option you can select during Setup.</td>
</tr>
<tr>
<td>Default Start Page</td>
<td>Takes you to the server’s current default start page for all users. For more information on how to change the default start page, see Set the Default Start Page for All Users. Individual users will be able to override this setting (search for &quot;Access Your Profile and Account Settings&quot; in the Tableau Server Help for details).</td>
</tr>
<tr>
<td>Language and Locale</td>
<td>Controls the language used for the server user interface and the locale used for views. Individual users can override this setting on their</td>
</tr>
<tr>
<td>Account Settings page. Also, web browser settings are evaluated first to determine which language and locale should be used. For more information, see Language and Locale for Tableau Server.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>Active Directory Synchronization</strong> - Synchronize Active Directory groups on a regular schedule Controls the synchronization of all Active Directory groups in Tableau Server based on a schedule that you specify after you select the option <strong>Synchronize Active Directory groups on a regular schedule</strong>. For more information, see Synchronize All Active Directory Groups on the Server.</td>
<td></td>
</tr>
<tr>
<td><strong>Reset to Default Settings</strong> Any server settings that have been changed since setup are returned to their original state.</td>
<td></td>
</tr>
</tbody>
</table>

**Troubleshooting**

**Work with Log Files**

Tableau Server creates log files as a normal part of its activities. You may need to use the server log files when you are troubleshooting issues with Tableau Server or if Tableau Support requests logs to help you resolve an issue.

You can create a zipped log file archive (snapshot) from the command line on the server, or using the Generate Snapshot option on the Maintenance page. The zipped archive contains copies of the logs you can copy or download using a web browser, and send to Tableau Support. Once you have a copy of the archive, you can delete the archive from your server. For more information on creating, downloading and deleting log file archives, see Archive Logs on Status Page (Snapshot).

This collection of topics provides information about how to create log file archives, the contents of specific log files, and details about when and how you might want to look at a log.
Investigating Tableau Server Issues

The range and complexity of possible issues with Tableau Server means that there is no simple process you can use to investigate all problems, but a general approach would include these steps:

1. **Clean up** existing log files to reduce their size. For more information, see Remove Unneeded Files.
2. **Set the appropriate logging level.** This is something that Tableau Support will instruct you on. For more information, see Change Logging Levels.
3. **Reproduce the issue** you are troubleshooting so the logs capture the events related to the problem.
4. **Create an archive** of the logs. For more information see Archive Log Files.
   
   **Important:** Use this archive when looking at the log files. You should not edit, move or delete any files directly on the server.

5. **Review the server configuration file** (`\config\tabsvc.yml`) to get a basic understanding of the server environment.

6. **Review the admin log** (`\logs\tabadmin.log`) to understand any maintenance that has been done on the server.

   Search for `run as: <script>` to find entries specific to tabadmin activity.

7. **Review the Apache logs** (`\httpd\access.####__##_##_##.log` and `\httpd\error.log`) for requests that may be related to the issue you are investigating.

   The Apache logs will contain a fair amount of "noise" that does not apply to issues you are experiencing.

   - If you find a request that seems to be related to your issue, search `\vizqlserver` for entries that include the unique request ID from the Apache logs.
- Look for the response code and message associated with the request ID.
- Search for the name of the workbook, view, dashboard, or data source that is related to your issue. Make sure to look for a relevant timestamp.
- If you find a request that seems to be related to your issue, look at the response code associated with the request. (200s are good, 500s indicate problems.)
- Locate the unique request ID associated with the request you've identified (the unique request ID is a 24 character alphanumeric string at the very end of the request).

8. **Review the log archive** further to search for other messages and possible errors.

   - Use the request ID from the Apache logs to search the `\vizqlserver` folder of the log archive for files containing related log entries. Look for indications of a problem (for example, error messages or long-running queries).

9. **Contact support**

    If you are not able to solve the issue yourself, or if requested by Tableau Support, send the zipped archive to Tableau.

See the following topics for more information:

**Tableau Server Processes**

Tableau Server installs a number of processes that work together to deliver the features that make up Tableau Server.

In this topic

- Configuring processes
- Licensed processes
- List of processes

Configuring processes

Certain processes listed below cannot be configured: cluster controller and coordination service are installed on every node as part of the base install. They are required on every server node and do not count against a core-based license. File store is installed when you install
data engine and cannot be installed separately. Every instance of a data engine process will always have one instance of the file store process present as well.

The topics Performance Tuning Examples and High Availability describe some of the approaches you can take when configuring processes. High-level status for each process is displayed on the server’s Status page and more detailed information related to some of the processes—such as the background process—is in the Administrative Views topic.

Licensed processes

Some of the processes that are installed as a part of Tableau Server are "licensed" processes. Licensed processes need a valid Tableau Server license in order to run. Other processes that are installed as a part of Tableau Server are not tied to a valid license. This has the following impact:

- Every licensed process needs to regularly contact the Tableau Server License Manager service that runs on the primary Tableau Server computer to verify they are licensed. If they cannot confirm there is a valid license, for example, if the primary node is not available, the process will not run and Tableau Server may not function properly or reliably.

- If you have a core-based Tableau Server license, the cores on any node with a licensed processes will count against the total count of licensed cores.

The "Licensed" column in the table below identifies those processes that require a valid license, and which impact the count of cores in core-based licenses.

List of processes

For information on log files generated by these processes, see Server Log File Locations.

<table>
<thead>
<tr>
<th>Process</th>
<th>Purpose</th>
<th>Multi-Threa ded</th>
<th>Performance Characteristics</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server</td>
<td>Handles</td>
<td>Yes</td>
<td>Only consumes noticeable resources</td>
<td>Yes</td>
</tr>
<tr>
<td>vizportal.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>the web application, REST API -</td>
<td>during infrequent operations, like publishing a workbook with an extract, or</td>
<td>No</td>
<td>A single-threaded process where multiple processes can be run on any or all machines in the</td>
<td>Yes</td>
</tr>
<tr>
<td>calls, supports browsing and search-</td>
<td>generating a static image for a view. Its load can be created by browser-based interaction and by tabcmd.</td>
<td></td>
<td>capacity. The backgrounder normally doesn't consume much process memory, but it can consume CPU,</td>
<td></td>
</tr>
<tr>
<td>ing</td>
<td></td>
<td></td>
<td>I/O, or network resources based on the nature of the workload presented to it. For example, performing large extract refreshes can use network bandwidth to retrieve data. CPU resources can be consumed by data retrieval or complex tabcmd tasks.</td>
<td></td>
</tr>
<tr>
<td>Backgrounder backgrounder.exe</td>
<td></td>
<td></td>
<td>A query cache distributed and shared across the server cluster. This in-memory cache speeds user experience across many scenarios. VizQL server, backgrounder, and data server (and API server and applic-</td>
<td>No</td>
</tr>
<tr>
<td>Cache Server</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>redis-server.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threa-</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(annotation server to a lesser extent) make cache requests to the cache server on behalf of users or jobs. The cache is single-threaded, so if you need better performance you should run additional instances of cache server.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clusters Controller</td>
<td>Responsible for monitoring various components, detecting failures, and executing failover when needed</td>
<td>n/a</td>
<td>Included in the base install on every node.</td>
<td>No</td>
</tr>
<tr>
<td>cluster-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>controller.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination Service</td>
<td>In distributed installations, responsible for ensuring there is a quorum for making decisions</td>
<td>n/a</td>
<td>Always installed on the primary node. For server installations with three to five nodes, also installed on the first two worker nodes. For server installations of more than five nodes, also installed on the first four worker nodes.</td>
<td>No</td>
</tr>
<tr>
<td>zookeeper.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Data Engine</td>
<td>Stores data extracts and answers queries</td>
<td>Yes</td>
<td>The data engine’s workload is generated by requests from the VizQL server, application server, API server, data server, and backgrounder server processes. The data engine services requests from most of the other server processes as well. It is the component that loads extracts into memory and performs queries against them. Memory consumption is primarily based on the size of the data extracts being loaded. The data engine is multi-threaded to handle multiple requests at a time. Under high load it can consume CPU, I/O, and network resources, all of which can be a performance bottleneck under load. At high load, a single instance of the data engine can consume all CPU resources to process requests.</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Server</td>
<td>Manages connections to Tableau Server data</td>
<td>Yes</td>
<td>Because it’s a proxy, it’s normally only bound by network, but it can be bound by CPU with enough simultaneous user sessions. Its load is generated by browser- and Tableau Desktop-</td>
<td>Yes</td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>File Store filestore.exe</td>
<td>automatically replicates extracts across data engine nodes</td>
<td>n/a</td>
<td>Installed with data engine (cannot be installed separately). A file store process will always be present if there are one or more data engine processes installed.</td>
<td>No</td>
</tr>
<tr>
<td>Repository postgres.exe</td>
<td>Tableau Server database, stores workbook and user metadata</td>
<td>n/a</td>
<td>Normally consumes few resources. It can become a bottleneck in rare cases for very large deployments (thousands of users) while performing operations such as viewing all workbooks by user or changing permissions. For more information, see Tableau Server Repository.</td>
<td>No</td>
</tr>
<tr>
<td>Search &amp; Browse search-server.exe</td>
<td>Handles fast search, filter, retrieval, and display of content metadata on the server</td>
<td>Yes</td>
<td>The process is memory bound first, and I/O bound second. The amount of memory used scales with the amount of content (number of sites/-projects/workbooks/datasources/views/users) on the server.</td>
<td>No</td>
</tr>
<tr>
<td>VizQL Server vizqlserver.exe</td>
<td>Loads and</td>
<td>Yes</td>
<td>Consumes noticeable resources during operations.</td>
<td>Yes</td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>----------------</td>
<td>-----------------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>renders views, computes and executes queries</td>
<td></td>
<td>ing view loading and interactive use from a web browser. Can be CPU bound, I/O bound, or network bound. Process load can only be created by browser-based interaction. Can run out of process memory.</td>
<td></td>
</tr>
</tbody>
</table>

Archive Log Files

You can create archives (snapshots) of log files in two different ways: from the Status page using a browser, or from a command prompt using tabadmin on Tableau Server. Creating a log file archive gives you a zipped snapshot of logs that you can use for troubleshooting or to send to Tableau Support for help with an issue.

Quick Start: Generate a Snapshot of Server Logs

Server administrators can quickly generate and download a zipped snapshot of Tableau Server logs from the Server Status page. The snapshot contains a copy of up to seven days of log information and does not affect the actual logs on the server. You can create the snapshot from any browser, and there’s no need to stop the server first.

1 Navigate to the Snapshot Feature

On the Server > Status page, scroll to the bottom of the page:
2 Generate a Snapshot

Click **Generate Snapshot**. If you’re running a distributed installation of Tableau Server this will collect logs from all servers in the cluster.
You do not have to stop the server before generating a snapshot.

The **Generate Snapshot** button is available only if no snapshot exists. If an earlier snapshot exists, you need to delete it before generating a new snapshot. Download the existing snapshot first, if you think it contains information you might need.

3 Download a Snapshot

Click **Download Snapshot** to copy the zipped log files to your local computer:

The **Download Snapshot** button is available after the snapshot is generated. The downloaded snapshot is saved to the default download location for your web browser.

4 Delete a Snapshot

Click **Delete Snapshot** to remove an existing snapshot from Tableau Server:
Deleting the snapshot does not delete Tableau Server log files. You are just deleting the snapshot created from those files.

Archive Logs on Status Page (Snapshot)

You can generate and download a snapshot (archive) of the Tableau Server log files from a web browser, without opening a command prompt. This zipped snapshot contains a copy of up to seven days of log file data from Tableau Server and any worker servers (if you have a distributed environment). The snapshot process does not change or remove either the Tableau Server log files or the log archives created with tabadmin.

**Note** To specify the amount of data you want to collect or the name of the zip file you are creating, use tabadmin to create an archive of server logs. For more information, see Archive Logs on Command Line (tabadmin).

To generate a snapshot of server log files:

1. Open the Status page:
   - Multi-site: Select **Server > Status**.
   - Single-site: Select **Status**.

2. Click **Generate Snapshot** to create a snapshot of the Tableau Server logs. The Generate Snapshot button is available only if there is no existing snapshot.
**Note:** This option is available whether or not you have created log archives with `tabadmin`.

<table>
<thead>
<tr>
<th>Log Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Generated</td>
</tr>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

3. Select the number of days of logs you want to include. The default is **Last 7 days**, but you might want to select fewer if you want to reduce the size of the zip file. If you are collecting logs after reproducing an issue, include at least three days worth of logs.

4. Click **Download Snapshot** to download the log snapshot to your web browser's default download location. This option is available after you create a snapshot.

Google Chrome shows you the download in the bottom of the window:
5. Click the arrow and then click **Open** to unzip the snapshot or **Show in folder** to see where it was downloaded:

6. (Optional) Click **Delete Snapshot** to delete a log snapshot. This option is available after you create a snapshot. You need to delete the existing snapshot before you can create a new one.
For example, you might want to delete the snapshot that you created before an event that you want to investigate.

Uploading log archives for Tableau Support

If you are creating the archive to send to Tableau Support, see the Knowledge Base for information about how to upload large files.

Archive Logs on Command Line (tabadmin)

If you have command line access on the primary Tableau Server computer, you can archive Tableau Server log files using the `tabadmin ziplogs` command.

This command creates a zip file containing all of the log files and is useful when you're working with Tableau Support. If you are running a distributed installation of Tableau Server, perform this step from the primary server. Any worker logs will be included in the zip file.

You may also want to create a log file archive before you run the `tabadmin cleanup` command, because that command removes logs. The ziplogs command does not remove the log files, rather it creates an archive by copying them into a zip file. For more information about cleaning up Tableau Server files, see Remove Unneeded Files.

Note: The `tabadmin ziplogs` command may generate messages like "zip error: Nothing to do!" These are generally related to specific steps in the zip process and do not mean the log file archive is empty or the entire archive process failed.

To create a log file archive:
1. Open a command prompt as administrator and navigate to the Tableau Server bin directory. For example:

   `cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"

2. Create the zip file by typing `tabadmin ziplogs -l -n <filename>` where `<filename>` is name of the zipped archive file you want to create. Choose a unique name with no spaces. Tableau will not overwrite an existing file. To create the file in a location other than the `\bin` directory, include the path with the file name. The path cannot be a UNC path.

   For example:

   `tabadmin ziplogs -l -n my_logs`

   If you don't specify a file name, the file is named `logs.zip`.

   You can also use `-d mm/dd/yyyy` to only include logs generated since a certain date. For example:

   `tabadmin ziplogs -l -n -d 12/14/2015`

   The above command creates a zipped file named `logs.zip` that includes logs dated December 14, 2015 up to the present; earlier logs are excluded. The `-n` option captures information about the server environment, including which ports are in use. To see a list of all the `ziplogs` options, type `tabadmin ziplogs -h`.

   You can find the zipped log file archive in the Tableau Server bin directory unless you specified a different location by including a path with the file name.

   Uploading log archives for Tableau Support

   If you are creating the archive to send to Tableau Support, see the Knowledge Base for information about how to upload large files.

   Server Log File Locations

   By default, Tableau Server log file archives are gathered in a zip file called `logs.zip` (you can specify a different name if you create the archive using `tabadmin`). You can copy the
archive from the server to a local computer and open it there, or send it to Tableau Support. When you unzip the archive, a series of folders are created with related log files. This table explains the possible contents of each folder, along with the original location the files came from on the Tableau Server, the process that created the log files, and details about the files.

Log Archive File Locations (unzipped archive)

<table>
<thead>
<tr>
<th>Files/folders in logs.zip</th>
<th>Details</th>
<th>Files</th>
<th>Generated by</th>
<th>Location on Tableau Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>build-version.txt</td>
<td>The build version of Tableau Server.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tabsvc.yml</td>
<td>Logs related to repository encryption.</td>
<td>assetkey-encryption.log</td>
<td>tabadmin assetkeys</td>
<td>\log-s\assetkeys-encryption</td>
</tr>
<tr>
<td>assetkey-encryption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>backgrounder</td>
<td>Logs related to subscriptions and scheduled activities like extract refreshes, &quot;Run Now&quot; tasks, and tabcmd tasks.</td>
<td>backgrounder-#.log, spawn.####.log, tomcat-#.#####-.##-##.log</td>
<td>backgrounder.exe</td>
<td>\log-s\backgrounder</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Logs</td>
<td>redis-serv-</td>
<td></td>
<td>\cacheserver</td>
</tr>
</tbody>
</table>

- 1234 -
<table>
<thead>
<tr>
<th><strong>cacheserver</strong></th>
<th>related to the Cache Server process.</th>
<th>er.exe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cluster-controller</strong></td>
<td>Logs related to the Cluster Controller process.</td>
<td>cluster-controller.log</td>
</tr>
</tbody>
</table>
| **config** | Configuration files.  
This is a good place to start gathering information when troubleshooting. Confirm that the configuration settings are what you expect. | connections.yml | workgroup.yml | Tableau Server Configuration | \config |
<p>| <strong>data-collector</strong> | | | | \logs\datacollector |</p>
<table>
<thead>
<tr>
<th>dataengine</th>
<th>There will be a tdeserver log file for each day with information about data extracts and queries, and responses to VizQL server requests.</th>
<th>tdeserver_######_###.log</th>
<th>tdeserver.exe tdeserver-64.exe</th>
<th>\logs\dataengine</th>
</tr>
</thead>
<tbody>
<tr>
<td>dataserver</td>
<td>Information about connections to Tableau Server data sources.</td>
<td>dataserver-#.log</td>
<td>dataserver.exe</td>
<td>\logs\dataserver</td>
</tr>
<tr>
<td>httpd</td>
<td>Apache logs. Look here for authentication entries. Each request in the Apache log will have a request</td>
<td>access.###-###.###-###-###-log error.log startup.log</td>
<td>Apache daemon</td>
<td>\logs\httpd</td>
</tr>
</tbody>
</table>
ID associated with it. This request ID is used throughout the server logs and you can use it to associate log entries with a request.

<table>
<thead>
<tr>
<th>Licensing</th>
<th>\logs\licensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logs</td>
<td>\logs</td>
</tr>
</tbody>
</table>

This is the location of the logs of most interest and usefulness. Look here after reviewing the configuration files.

- tabadmin.log
- tabconfig.log
- tablicsrv.log
- tabsrvlic.log

Tabadmin.log is never overwritten or
truncated so it contains all the details.

notify-tabadmin.log contains errors from tabadmin.log (the errors are also included in tabadmin.log).

tablicsrv.log and tab-srvlic.log are related to licensing.

<table>
<thead>
<tr>
<th>pgsql</th>
<th>Post-greSQL database logs, including files related to launching server processes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>repository</td>
<td>postgres.exe</td>
</tr>
<tr>
<td></td>
<td>tabspawn</td>
</tr>
<tr>
<td>Service</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>service</td>
<td>notify-tabsvc.log, tabsvc.log</td>
</tr>
<tr>
<td>solr</td>
<td>Related to search indexing.</td>
</tr>
<tr>
<td>svcmonitor</td>
<td></td>
</tr>
<tr>
<td>tabadminservice</td>
<td>Related to log archives created using the Generate a Snapshot of Server Log Files option.</td>
</tr>
<tr>
<td>tabadmwrk</td>
<td>Server Worker Manager process that is used for auto-discovery of worker servers in a distributed environment.</td>
</tr>
<tr>
<td>vizportal</td>
<td>Information related to administrative</td>
</tr>
<tr>
<td><strong>tasks, work-</strong></td>
<td><strong>rest api</strong></td>
</tr>
<tr>
<td><strong>book and</strong></td>
<td><strong>requests.</strong></td>
</tr>
<tr>
<td><strong>permissions</strong></td>
<td><strong>requests.</strong></td>
</tr>
<tr>
<td><strong>management,</strong></td>
<td><strong>vizqlserver</strong></td>
</tr>
<tr>
<td><strong>authentication,</strong></td>
<td><strong>Related to</strong></td>
</tr>
<tr>
<td><strong>sign-ins,</strong></td>
<td><strong>showing</strong></td>
</tr>
<tr>
<td><strong>initial view</strong></td>
<td><strong>inter-</strong></td>
</tr>
<tr>
<td><strong>requests,</strong></td>
<td><strong>acting with</strong></td>
</tr>
<tr>
<td><strong>and publish-</strong></td>
<td><strong>views.</strong></td>
</tr>
<tr>
<td><strong>ing requests.</strong></td>
<td><strong>When run-</strong></td>
</tr>
<tr>
<td><strong>REST API</strong></td>
<td><strong>ning mul-</strong></td>
</tr>
<tr>
<td><strong>requests.</strong></td>
<td><strong>tiple</strong></td>
</tr>
<tr>
<td><strong>vizqlserver</strong></td>
<td><strong>instances of</strong></td>
</tr>
<tr>
<td></td>
<td><strong>VizQL</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Server, the</strong></td>
</tr>
<tr>
<td></td>
<td><strong>instances</strong></td>
</tr>
<tr>
<td></td>
<td><strong>are dis-</strong></td>
</tr>
<tr>
<td></td>
<td><strong>tinguished</strong></td>
</tr>
<tr>
<td></td>
<td><strong>by port num-</strong></td>
</tr>
</tbody>
</table>

<p>| <strong>vizqlserver</strong> | <strong>vizql-0.log.###-</strong> |
| | <strong>spawn.###.log</strong> |
| | <strong>vizqlserver.exe</strong> |
| | \logs\vizqlserver |</p>
<table>
<thead>
<tr>
<th>notify-proDUCTION logs contain exceptional events.</th>
<th>notify-proDUCTION logs contain exceptional events.</th>
<th>notify-proDUCTION logs contain exceptional events.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most files are in JSON format.</td>
<td>Most files are in JSON format.</td>
<td>Most files are in JSON format.</td>
</tr>
<tr>
<td>tabprotosrv.txt is created when you open data or connect to data.</td>
<td>tabprotosrv.txt is created when you open data or connect to data.</td>
<td>tabprotosrv.txt is created when you open data or connect to data.</td>
</tr>
<tr>
<td>backgrounder_##<em>###</em>##<em>##</em>##.txt</td>
<td>backgrounder_##<em>###</em>##<em>##</em>##.txt</td>
<td>backgrounder_##<em>###</em>##<em>##</em>##.txt</td>
</tr>
<tr>
<td>dataserver_##<em>###</em>##<em>##</em>##.txt</td>
<td>dataserver_##<em>###</em>##<em>##</em>##.txt</td>
<td>dataserver_##<em>###</em>##<em>##</em>##.txt</td>
</tr>
<tr>
<td>tabadmin_##<em>##</em>##_##.txt</td>
<td>tabadmin_##<em>##</em>##_##.txt</td>
<td>tabadmin_##<em>##</em>##_##.txt</td>
</tr>
<tr>
<td>tabprotsrv.txt</td>
<td>tabprotsrv.txt</td>
<td>tabprotsrv.txt</td>
</tr>
<tr>
<td>vizqlserver_##<em>###</em>##<em>##</em>##.txt</td>
<td>vizqlserver_##<em>###</em>##<em>##</em>##.txt</td>
<td>vizqlserver_##<em>###</em>##<em>##</em>##.txt</td>
</tr>
<tr>
<td>tdserver_vizqlserver_##<em>##</em>##.txt</td>
<td>tdserver_vizqlserver_##<em>##</em>##.txt</td>
<td>tdserver_vizqlserver_##<em>##</em>##.txt</td>
</tr>
<tr>
<td>zookeeper spawn.##.log</td>
<td>zookeeper spawn.##.log</td>
<td>zookeeper spawn.##.log</td>
</tr>
<tr>
<td>zookeeper-#.log</td>
<td>zookeeper-#.log</td>
<td>zookeeper-#.log</td>
</tr>
<tr>
<td>zookeeper.exe</td>
<td>zookeeper.exe</td>
<td>zookeeper.exe</td>
</tr>
<tr>
<td>\logs\vizqlserver</td>
<td>\logs\vizqlserver</td>
<td>\logs\vizqlserver</td>
</tr>
<tr>
<td>\logs\zookeeper</td>
<td>\logs\zookeeper</td>
<td>\logs\zookeeper</td>
</tr>
</tbody>
</table>
Tableau Server Log File Locations

If you installed Tableau Server in the default location, the log directory is `C:\ProgramData\Tableau\Tableau Server\data\tabsvc\logs`. The ProgramData folder is hidden unless you explicitly make it visible.

The following log files track activities related to the web application, database, and index:

- `C:\ProgramData\Tableau\Tableau Server\data\tabsvc`

If you have installed Tableau Server to a non-default location (for example, on a drive other than the system drive), then the logs directory is located at `<installation path or drive>\Tableau\Tableau Server\logs`. For more information, see Installation directory.

VizQL Logs

These log files track activities related to displaying views, such as querying the database and generating images:

- `C:\ProgramData\Tableau\Tableau Server\data\tabsvc\vizqlserver\Logs`

Temporary Files

Any file that starts with `exe_` in the folder below is a Tableau Server file and can be deleted.

- `C:\ProgramData\Tableau\Tableau Server\temp`
Change Logging Levels

By default, Tableau Server logs events at the **info** level. You can change this if you need to gather more information (if you are working with Tableau Support, for example). As a best practice you should not increase logging levels except when troubleshooting an issue.

Logging Levels

The following logging levels are listed in order of increasing amount of information logged:

- off
- fatal
- error
- warn
- info (the default)
- debug
- trace

**Note:** Increasing the log level to debug or trace increases the amount of information being logged and can have a significant impact to performance. You should only set a logging level to debug when investigating a specific issue. Reproduce the issue and then reset the logging level back to info.

Change Logging Levels

Set logging levels for Tableau Server using one of several **tabadmin set** commands. The command you use depends on which component of Tableau Server you want to change the logging level for.

<table>
<thead>
<tr>
<th>Command</th>
<th>Location of affected logs</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;process&gt;.native_api.log.level</code></td>
<td>(\text{Path begins with } \backslash \text{ProgramData}\backslash \text{Tableau}\backslash \text{Tableau Server-datatabsvc})</td>
</tr>
<tr>
<td></td>
<td><code>\vizqlserver\Logs\*.txt</code></td>
</tr>
</tbody>
</table>
Valid process names are backgrounder, vizportal, vizqlserver, or dataserver

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Log Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>vizportal.log.level</td>
<td>\vizportal*.log</td>
</tr>
<tr>
<td>vizqlserver.log.level</td>
<td>\vizqlserver*.log</td>
</tr>
</tbody>
</table>

For more information, see tabadmin set options.

You need to stop Tableau Server before changing the logging levels, and restart it afterward. If you are running a distributed installation of Tableau Server, set logging levels from the primary server.

To change the logging level:

1. Open a command prompt as administrator and navigate to the Tableau Server bin directory.
   
   If Tableau Server is installed on the C drive:
   
   C:\Program Files\Tableau\Tableau Server\10.2\bin
   
   or
   
   C:\Program Files (x86)\Tableau\Tableau Server\10.2\bin

2. Stop Tableau Server by typing:
   
   tabadmin stop

3. Set the logging level to by typing `tabadmin set [command][option]`
   
   where `[command]` is `<process>.native_api.log.level` or `vizqlserver.log.level`

   and `[option]` is a valid logging level.
Examples:

- tabadmin set vizqlserver.native_api.log.level debug
- tabadmin set vizqlserver.log.level warn
- tabadmin set vizportal.log.level debug

4. Restart Tableau Server by typing:

    tabadmin restart

Reset Logging Levels

After you gather the information related to the issue you are investigating, reset the logging levels so there is no lingering performance impact.

Reset the logging level back to its default (info) using the appropriate command with a -d option.

Examples:

- tabadmin set vizqlserver.native_api.log.level -d
- tabadmin set vizportal.log.level -d
- tabadmin set vizqlserver.log.level -d

Handle an Unlicensed Server

Tableau offers two licensing models: user-based and core-based. User-based licensing requires each active user account to be covered by a license. User-based licenses have a defined capacity, or number of users that it allows. Each user is assigned a unique user name on the server and is required to identify himself when connecting to the server.

Core-based licensing has no constraints on the number of user accounts in the system, but it does restrict the maximum number of processor cores that Tableau Server can use. You can install Tableau Server on one or more machines to create a cluster, with the restriction
that the total number of cores in all the machines does not exceed the number of cores you have licensed and that all of the cores on a particular machine are covered by the license.

**Unlicensed User-Based Server**

The most common reason for a server that has user-based licensing to be unlicensed is an expired product key or an expired maintenance contract. You can see your products keys and add new ones by selecting **Start > All Programs > Tableau Server > Manage Product Keys.**

**Unlicensed Core-Based Server**

A core-based server can become unlicensed for a variety of reasons. A common problem is that the primary or a worker node has more cores than the license allows. When the server is unlicensed you may not be able to start or administer the server. You can, however, manage your licenses using the **tabadmin command line tool.** Follow the steps below to see a list of your licenses and number of cores by machine.

1. Open a command prompt as administrator and navigate to the Tableau Server bin directory. For example, on a default install, type the following: `cd C:\Program Files\Tableau\Tableau Server\10.2\bin`

2. Type the following: `tabadmin licenses -p`.

**Handle an Unlicensed VizQL Server Process**

There are several status indicators on the Tableau Server Status page that help you understand the state of Tableau Server processes. An orange-color status box, "Unlicensed", indicates that one of the VizQL server processes is unable to retrieve the Tableau Server license information.
There may be several reasons why the process is unable to access this information. For example, there may be network issues preventing a VizQL process, which is running on a worker machine, from communicating with the primary machine. Or, the process may be getting sent more requests than it can accept at that time and can’t handle the licensing request. As a result, some of your users may be able to access views while others cannot.

To resolve the problem, stop, then start Tableau Server.

Cookie Restriction Error

When a user signs in to Tableau Server, a session cookie is stored in their local browser. The stored cookie is how Tableau Server maintains that the signed in user has been authenticated and can access the server. Because the cookie is set with the same domain or sub-domain as the browser’s address bar, it is considered a first-party cookie. If a user's browser is configured to block first-party cookies, they will be unable to sign in to Tableau Server.

When a user signs in to Tableau Server via an embedded view, or in an environment where trusted authentication has been configured, the same thing happens: a cookie is stored. In
this case, however, the browser treats the cookie as a third-party cookie. This is because the cookie is set with a domain that's different from the one shown in the browser's address bar. If a user's web browser is set to block third-party cookies, authentication to Tableau Server will fail. To prevent this from occurring, web browsers must be configured to allow third-party cookies.

**Troubleshoot Data Sources**

For users to work with Tableau Server data sources, up to three things need to be in place:

- **Permissions for the data source:** Anyone connecting to a data source must have the Connect and View permissions for it. This also applies to users accessing views that connect to data sources. Anyone publishing and modifying data sources must be licensed to Publish and also have the Write/Save As and Download/Web Save As permissions. See Set Permissions on Individual Content Resources for more information.

  Multidimensional (cube) data sources have to be downloaded and used in Tableau Desktop, so they require Download/Web Save As permission. For more information about cubes in Tableau, see Cube Data Sources.

- **Ability to authenticate to the database:** There are several ways you can connect to data in Tableau and control who has access to what. Basically, whichever entity is connecting to the database must be able to authenticate. The entity could be Tableau Server performing an extract refresh. It could be a Tableau Desktop user connecting to a data source that then connects to a live database. It could also be a Tableau Server user who’s accessing a view that connects to a live database. Refer to Data Security to learn more about your options.

- **Database drivers:** If the person who created and published the data source in Tableau Desktop needed to install additional database drivers, you may need to install them on Tableau Server as well. If you are running a distributed installation of Tableau Server where, for example, the data server process is running on a worker server, any required database drivers must be installed there as well as on the primary
server. Other processes require drivers as well. See Database Drivers for more information.

Data Source Error Messages

Here are some errors that workbook authors and other users may encounter as they work with data sources and views:

**Permission to access this Tableau Server data source denied:** Connecting to a data source requires the Connect permission. See Set Permissions on Individual Content Resources for more information.

**Data source not found:** Someone working with a view may see this error if a data source is removed from Tableau Server or if their Connect to Data page needs to be updated. To update the Connect to Data page in Tableau Desktop, click the Refresh icon:

![Refresh icon](image)

**Unable to connect to this Tableau Server data source:** This error may appear if the connection information for the data source has changed—for example, as a result of the database server name changing. Look at the Data Connection information for the data source and confirm that it has the correct settings.

**Unable to list Tableau Server data sources:** This error may occur if a user is trying to access Tableau Server data sources and there are connectivity issues between Tableau Server and Tableau Desktop.

**Can’t connect with a cube data source:** To use a published multidimensional (cube) data source, you must download the data source and use it in Tableau Desktop. Verify that
you have the **Download/Web Save As** permission for the data source. For more information about cubes in Tableau, see **Cube Data Sources**.

**Troubleshoot Subscriptions**

"The view snapshot in this email could not be properly rendered."

If you receive a subscription with this error message, there could be several reasons:

- **Missing credentials**: Some views are published with embedded credentials. You may receive the above error if the embedded credentials are now out-of-date, or if the view was republished without the embedded credentials.

- **Database temporarily down**: If the view has a live database connection and the database was temporarily down when the subscription was being generated, you might receive the above error.

- **Background process timeout**: By default, the background process that handles subscriptions times out after 30 minutes. In the majority of cases, this is plenty of time. However, if the background process is handling an extraordinarily large and complex dashboard, that may not be enough time. You can check the Background Tasks for Non Extracts admin view to see if that's the case. To increase the timeout threshold, use the `tabadmin` option `subscriptions.timeout`.

**Can't subscribe**

If you can see a view on Tableau Server and it has a subscription icon () in the upper right corner, you can subscribe to it.

Two things need to be in place for you to subscribe to a view: Tableau Server needs to be correctly configured (described in Set Up Subscriptions) and the view you're subscribing to must either have embedded credentials for its data source or not rely on credentials at all. Examples of the latter include a workbook that connects to an extract that isn't being refreshed, or a workbook whose data is in a file that was included with the workbook at pub-
lish time. Embedding credentials is a step that happens in Tableau Desktop (see the Tableau Desktop help for details).

No subscription icon

It’s possible to see a view on Tableau Server but be unable to subscribe to it. This happens for views with live database connections, where you’re prompted for your database credentials when you first click the view. A subscription includes a view (or workbook), data, and a schedule. To deliver the data piece, Tableau Server either needs embedded database credentials or data that doesn’t require credentials. Where live database connections are concerned, Tableau Server doesn’t have the credentials, only the individual users do. This is why you can only subscribe to views that either don’t require credentials or have them embedded.

You may also be able to see a view but be unable to subscribe to it (no subscription icon) if Tableau Server is configured for trusted authentication. See Subscription Requirements for more information.

Receiving invalid or "broken" subscriptions

If you configured subscriptions on test or development instances of Tableau Server in addition to your in-production instance, disable subscriptions on your non-production instances. Keeping subscriptions enabled on all instances can result in your users receiving subscriptions that appear to be valid, but which don’t work, or receiving subscriptions even though they’ve unsubscribed from the view or workbook.

Subscriptions not arriving ("Error sending email. Can't send command to SMTP host.")

You may see the above error in Windows Event Viewer if subscriptions appear to be sent (according to the Background Tasks for Extracts admin view), yet subscriptions aren’t arriving, and your SMTP server is using encrypted (SSL) sessions. Subscriptions are only supported for unencrypted SMTP connections. The solution is to use an unencrypted SMTP server.
Custom scripts not working after upgrade to 8.1

To support better session management, starting with version 8.1, a hash tag (#) was added to the end of view URLs. If you had custom subscriptions scripting that generated views as PDFs or PNGs you may need to update your scripts to allow for the hash tag.

For example, prior to version 8.1, view URLs use this syntax: http://tableauserver/views/SuperStore/sheet1. To generate a view as a PNG, .png could be added to the end of the URL. For example, http://tableauserver/views/SuperStore/sheet1.png.

In versions 8.1, 8.2, or 8.3, view URLs use this syntax: http://tableauserver/views/SuperStore/sheet1#1. To generate a PNG, add .png before the hash tag. For example: http://tableauserver/views/SuperStore/sheet1.png#1

Custom scripts not working after upgrade to 9.0

In version 9.0, the session ID at the end of server URLs is indicated by an "iid" parameter, :iid=<n>. For example, http://localhost/#/views/Sales2015/SalesMarginsByAreaCode?:iid=1. This parameter replaces the hash tag "#<n>" used for the session ID in 8.x versions of Tableau Server.

If you use custom subscriptions scripts that generate views as PDFs or PNGs, you may need to update your scripts by removing the hash tag and number (#<n>), and inserting the ?:iid= session ID parameter before the number.

Starting in version 9.0, view URLs use this syntax: http://tableauserver/views/SuperStore/sheet1?:iid=2.

To generate a PNG in version 9.0 and later, add .png before the session ID: http://tableauserver/views/SuperStore/sheet1.png?:iid=2
Troubleshoot SAML

This topic provides information about resolving issues that can occur when you configure SAML authentication.

SAML and Enable Automatic Logon

If you are using SAML and if Tableau Server is also configured to use Active Directory, do not also select **Enable automatic logon**. **Enable automatic logon** and SAML cannot both be used on the same server installation.

HTTP Status 500 error when configuring SAML

Under some circumstances you might get an HTTP status 500 error and see the following error after enabling SAML and navigating to the Tableau Server URL in a browser:

```
org.opensaml.saml2.metadata.provider.MetadataProviderException:
  User specified binding is not supported
  by the Identity Provider using profile urn:oasis
  is:names:tc:SAML:2.0:profiles:SSO:browser
```

To help resolve this error, make sure of the following:

- The IdP URL for the SSO profile specified in the SAML tab is correct.
- The IdP URL for the SSO profile provided while creating the service provider in the IdP is correct.
- The IdP is configured to use **HTTP-POST requests**. (Redirect and SOAP are not supported.)

If any of these settings were not correct, make appropriate updates and then perform the SAML configuration steps again, starting with generating and exporting the XML metadata document from Tableau Server.
If these settings are correct, but you still see the error, examine the metadata XML that is produced by Tableau Server and by the IdP, as described in SAML Requirements.

**Signing In from the Command Line**

SAML is not used for authentication when you sign in to Tableau Server using tabcmd or the Tableau Data Extract command line utility (provided with Tableau Desktop), even if Tableau Server is configured to use SAML. These tools require the authentication configured when Tableau Server was originally installed (either local authentication or AD).

**Login Failed**

Login can fail with the following message:

```
Login failure: Identity Provider authentication successful for user <username from IdP>. Failed to find the user in Tableau Server.
```

This error typically means that there is a mismatch between the usernames stored in Tableau Server and provided by the IdP. To fix this, make sure that they match. For example, if Jane Smith’s username is stored in the IdP as jsmith it must be stored in Tableau Server as jsmith.

**SAML Error Log**

SAML authentication takes place outside Tableau Server, so troubleshooting authentication issues can be difficult. However, login attempts are logged by Tableau Server. You can create a snapshot of log files and use them to troubleshoot problems. For more information, see Archive Log Files.

**Note:** To log SAML-related events, vizportal.log.level must be set to debug. For more information, see Change Logging Levels.

Check for SAML errors in the following files in the unzipped log file snapshot:

```
\vizportal\vizportal-<n>.log
```
In Tableau Server 9.0 and later, the application process (vizportal.exe) handles authentication, so SAML responses are logged by that process.

Trailing Slash

On the SAML tab, confirm that the Tableau Server return URL does not end with a trailing slash (correct: http://tableau_server; incorrect: http://tableau_server/):

Confirm Connectivity

Confirm that the Tableau Server you are configuring has either a routeable IP address or a NAT at the firewall that allows two-way traffic directly to the server.

You can test your connectivity by running telnet on Tableau Server and attempting to connect with the SAML IdP. For example: C:\telnet 12.360.325.10 80

The above test should connect you to the HTTP port (80) on the IdP and you should receive an HTTP header.
Troubleshooting Mutual SSL Authentication

This topic describes possible mutual (two-way) SSL authentication issues and their causes, the messages that users might see, and possible mitigation for the issues.

- The client is missing a certificate
- The client doesn't support mutual SSL authentication
- Client certificates are not published to Active Directory
- Users unexpectedly see a sign-in dialog box that displays an error message
- The user name in the UPN or CN fields is missing or invalid
- The user is signed in using unexpected user name (LDAP mapping)
- The user is signed in as incorrect user (UPN or CN mapping)

For more information about mutual SSL authentication and LDAP, UPN, and CN user mapping, see the following topics:

- Quick Start: Mutual (Two-Way) SSL Authentication
- Mapping a Client Certificate to a User During Mutual Authentication

We couldn't find a valid client certificate. Contact your Tableau Server administrator.

The client is missing a certificate.

If the client has no client certificate, the user sees this message during authentication:

We couldn't find a valid client certificate. Contact your Tableau Server administrator.

To resolve the issue, the user should contact the system administrator to generate a certificate for the client computer.
Invalid user name or password

The client doesn't support mutual SSL authentication.

Versions of Tableau Desktop older than version 9.1 do not support mutual SSL authentication. If an older version of Tableau Desktop is used to connect to Tableau Server that is configured for mutual SSL authentication, the following can occur:

- If Tableau Server is configured to use fallback authentication, the client displays a sign-in dialog box and the user can enter a user name and password.
- If the server is not configured to use fallback authentication, the user sees the following message and cannot connect to the server:

  Invalid user name or password

For more information about fallback authentication, see Quick Start: Mutual (Two-Way) SSL Authentication.

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator or sign in using your Tableau Server account.

Client certificates are not published to Active Directory.

If Tableau Server is configured to use Active Directory for authentication, and if user mapping is set to LDAP, Tableau Server sends the client certificate to Active Directory for authentication. However, if client certificates have not been published to Active Directory, authentication fails and the user sees the following message:

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator or sign in using your Tableau Server account.

To resolve this issue, the system administrator should make sure that client certificates are published to Active Directory. Alternatively, the server should be configured to use a
different user mapping (UPN or CN), and the system administrator should be sure that client certificates contain user names in the UPN or CN fields.

**Users unexpectedly see a sign-in dialog box that displays an error message**

If Tableau Server is configured to use mutual SSL authentication and certificates are available for use with users' computers, a user should not see a sign-in dialog box, because Tableau Server uses the certificate to authenticate the user. However, if the server does not recognize the user name in the certificate, the user sees a sign-in dialog box with an error message that indicates why the certificate was not used. This can occur when all of the following conditions are true:

- Fallback authentication is enabled.

- If the server is using UPN or CN mapping, the user name in the certificate’s UPN or CN field is not recognized. If the server is using LDAP mapping, the certificate is not mapped to the user in Active Directory.

To resolve this issue, the system administrator should do the following, depending on how user mapping is configured on Tableau Server:

- LDAP mapping: Make sure that the certificate is linked to the user, that the certificate is available for use with the user’s computer, and that the user is configured as a Tableau Server user.

- UPN or CN mapping: Make sure that the certificate is available for the user’s computer, that the user name is in the certificate’s UPN or CN field, and that the user name matches the user name on Tableau Server (including domain).

**We couldn't find your user name in the client certificate. Contact your Tableau Server administrator.**

**Certificate does not contain a valid Tableau Server user name.**

The user name in the UPN or CN fields is missing or invalid
When Tableau Server is configured to use UPN or CN mapping, the server reads the user's name from the UPN or CN field of the certificate and then looks up the user name in Active Directory or in the local repository on Tableau Server. (The specific field that the server reads depends on which mapping—UPN or CN—the server is configured to use.) If the field that is supposed to contain the user name has nothing in it, the user sees the following message:

We couldn't find your user name in the client certificate. Contact your Tableau Server administrator.

If a client certificate contains a user name but Active Directory and Tableau Server don't recognize the user name, the user sees the following message:

Certificate does not contain a valid Tableau Server user name.

This can occur when all of the following conditions are true:

- Tableau Server is configured to use UPN or CN mapping.
- Fallback authentication is not enabled.
- The client certificate has no user name in the UPN or CN field, or the user name in the UPN or CN field does not match a user name in Active Directory or on Tableau Server.

To resolve this issue, the system administrator should make sure that the user's certificate has the correct user name in the UPN or CN fields of the certificate.

The user is signed in using an unexpected user name (LDAP mapping)

When the server is configured to use Active Directory authentication and LDAP mapping, the certificate is linked to a user in Active Directory. If the certificate contains a user name in the UPN or CN field, that user name is ignored.

If the intention is that the user should be signed in with the user name in the UPN or CN fields, the server should be configured to use UPN or CN mapping.
The user is signed in as the incorrect user (UPN or CN mapping)

Under some circumstances, the user name in a UPN or CN field in the client certificate can be ambiguous. The result is that a user is signed in to the incorrect identity.

For more information about the conditions under which this issue can occur, see Ambiguous user names in multi-domain organizations in the topic Mapping a Client Certificate to a User During Mutual Authentication.

Troubleshoot Trusted Authentication

This section includes some common issues and errors you might encounter when you're configuring trusted authentication. Trusted authentication information is written to ProgramData\Tableau\Tableau Server\data\tabsvc\logs\vizqlserver\vizql-*.log. To increase the logging level from info to debug, use the tabadmin setting vizqlserver.trustedticket.log_level.

To test your trusted authentication deployment, see Testing Trusted Authentication.

Ticket Value of -1 Returned from Tableau Server

Tableau Server returns -1 for the ticket value if it cannot issue the ticket as part of the trusted authentication process. The exact reason for this message is written to the vizql*.log files in the following folder:

ProgramData\Tableau\Tableau Server\data\tabsvc\logs\vizqlserver

Here are some things to confirm:

- **All web server host names or IP addresses are added to trusted hosts**

  The IP address or host name for the computer sending the POST request must be in the list of trusted hosts on Tableau Server. See Add Trusted IP Addresses or Host Names to Tableau Server to learn how to add IP addresses or host names to this list.

- **Value of wgserver.trusted_hosts is properly formatted**
The list of trusted hosts you provided using the `wgserver.trusted_hosts` setting must be a comma-separated list with a space after each comma. For example, the list should be similar to the following: 192.168.1.101, 192.168.1.102, 192.168.1.103, or bigbox1.example.lan, bigbox2.example.lan, bigbox3.example.lan.

- **IP addresses are IPv4**

  If you are using IP addresses to specify trusted hosts, they must be in Internet Protocol version 4 (IPv4) format. An IPv4 address looks like this: 123.456.7.890. IPv6 addresses (for example, fe12::3c4a:5eab:6789:01c%34) are not supported as a way of inputting trusted hosts.

- **Username in POST request is a valid Tableau Server user**

  The username you send in the POST request must be a licensed Tableau Server user with a Viewer or Interactor license level. You can see a list of users and their license levels by signing in to Tableau Server as an administrator and clicking the Licensing link on the left side of the page.

- **Username in POST request includes domain**

  If Tableau Server is configured to use Local Authentication, the username that you send in the POST can be a simple string. However, if the server is configured for Active Directory you must include the domain name with the user name (domain\username). For example, the username parameter might be: `username=dev\jsmith`

- **Content-Type is specified**

  If you are designing an ASP.NET or C# application, you need to declare the content type in your HTTP request. For example, `http.setRequestHeader("Content-Type","application/x-www-form-urlencoded; charset=UTF-8")`. If you do not specify content type and Tableau Server returns a 1, the log files contain the error: "missing username and/or client_ip".
HTTP 401 - Not Authorized

If you receive a 401- Not Authorized error, you may have configured Tableau Server to use Active Directory with SSPI (see Enable automatic login). If your web server uses SSPI, you do not need to set up trusted authentication. You can embed views and your users will have access to them as long as they are licensed Tableau server users and members of your Active Directory.

If you see a 401 error (or a 302 - Redirect error) after you have deployed Tableau Server 10.2, then it's likely the trusted ticket code you have written to construct the URL for the client has not been updated to account for the two-part ticket URL format. See Get a Ticket from Tableau Server.

HTTP 404 - File Not Found

You may receive this error if your program code references a Tableau Server URL that does not exist. For example, your web server may construct an invalid URL that cannot be found when the webpage tries to retrieve it.

Invalid User (SharePoint or C#)

You may encounter this error if you’ve configured Tableau Server for trusted authentication.

The example code for the SharePoint .dll references the following GET request:

```
```

The above request will return the display name of the current Windows Active Directory user. If you want to use the login ID, then you will need to change the code to:

```
```

After you make the change, recompile the SharePoint .dll.

Attempting to Retrieve the Ticket from the Wrong IP Address

You may encounter this error if you’ve configured Tableau Server for trusted authentication.
The client web browser IP address is not considered by default when redeeming the ticket. If Tableau Server is configured to enforce client IP address matching, make sure that the client’s web browser IP address that is sent in the POST to Tableau Server is the same as when the browser tries to retrieve the embedded view. For example, in the Trusted Authentication diagram, if the POST request in step 3 sends the parameter client_ip=74.125.19.147, then the GET request in step 5 must come from that same IP address.

See Optional: Configure Client IP Matching to learn how to configure Tableau Server to enforce client IP address matching.

Cookie Restriction Error

When a user signs in to Tableau Server, a session cookie is stored in their local browser. The stored cookie is how Tableau Server maintains that the signed in user has been authenticated and can access the server. Because the cookie is set with the same domain or sub-domain as the browser’s address bar, it is considered a first-party cookie. If a user’s browser is configured to block first-party cookies, they will be unable to sign in to Tableau Server.

When a user signs in to Tableau Server via an embedded view, or in an environment where trusted authentication has been configured, the same thing happens: a cookie is stored. In this case, however, the browser treats the cookie as a third-party cookie. This is because the cookie is set with a domain that’s different from the one shown in the browser’s address bar. If a user’s web browser is set to block third-party cookies, authentication to Tableau Server will fail. To prevent this from occurring, web browsers must be configured to allow third-party cookies.

An error occurred communicating with the server (403)

If Tableau Server is configured for trusted authentication, you may receive this error after opening a new view in a browser and attempting to navigate back to views you’d opened earlier. Tableau Server provides protection against unauthorized reuse of VizQL sessions through the tabadmin set option `vizqlserver.protect_sessions`, which is set to `true` by default. Because Tableau Server is configured for trusted authentication, you may not also
need to enable `vizqlserver.protect_sessions`. To disable it, use `set` to change it to `false`.

**Handle Extract Refresh Alerts**

When Tableau Server cannot complete a scheduled refresh, an alert appears to indicate that the refresh has failed. If a scheduled refresh fails five consecutive times, Tableau Server suspends the refresh. When a refresh is suspended, Tableau Server does not try to run it again until someone takes an action that attempts to correct the cause of the failure.

**Note:** The number of consecutive failures for a refresh is set to five by default, but can be changed by a Tableau Server administrator, using the `tabadmin set backgrounder.failure_threshold_for_run_prevention` command. For more information, see `tabadmin set options`.

You will see the Alerts menu only if an extract refresh failed and you are:

- A system or site administrator
- The author of the workbook or data source that couldn’t be refreshed
- The author of a workbook that connects to a data source that couldn’t be refreshed

When you open the Alerts menu you can see more information about the refresh failure(s):
When a **Data source** is listed as **Embedded** it means that the data source definition (which includes things like the data source credentials or the database name) is embedded, or resides, within the workbook itself, originally created in Tableau Desktop.

When a data source name or workbook name is listed as the **Data source** (for example, **Data source: sales_data**), it means that the data source is a Tableau Server data source. The data source definition resides on Tableau Server.

In the Data pane on Tableau Desktop, you can determine whether the data source is on Tableau Server or is local. If the data source is on the server, a Tableau icon is displayed next to the data source name instead of a database icon:

```
Data          Analytics
cych Population
>CNh Sales by Region
```

**Resolving Extract Refresh Problems**

To resolve refresh issues, you can take any of these actions, based on the cause indicated in the alert:
• **Errors related to access token validation or user credentials**

You can resolve some extract refresh problems by clicking the **Connection Details** in the alert. Select the check box next to the problematic data source, click **Actions > Edit Connection**, and then enter the missing information. Click **Save** when you’re done. After you update the connection information, Tableau Server restarts the refresh schedule.

If you originally embedded the credentials or other data connection information when you published the workbook or data source from Tableau Desktop, you can also republish the workbook or data source. As part of the publishing process, you can choose to set a new refresh schedule. If you don’t choose a new schedule, Tableau Server restarts the existing schedule.

• **Errors that indicate the database was unreachable**

Confirm that the database is online and that you can sign in to access the data. You can use the **Try again** link in the alert to restart the refresh schedule.

If the problem cannot be corrected by editing the data connection, you will need to resolve it in Tableau Desktop and republish the workbook.

**Tip:** Administrators can edit data connections at any time on the **Data Connections** page, accessible from each site by clicking the **Content** tab and Data Connections.

**Troubleshoot Server Processes**

When Tableau Server is functioning properly, processes will show as Active, Busy or Passive (Repository). If there is additional information, a message appears below the status icon:

![Ready for removal](image)

Possible status indicators are:
The following sections provide troubleshooting recommendations for status messages that you may see.

Cluster Controller

This message will only display if you have more than two nodes.

⚠️ Status: Down; Message: "Node degraded"

One or more of the following are true:

- Repository on the node is stopped.
- Node cannot respond to failover elsewhere on the cluster.
- If Tableau Server is configured for high availability and this is the active repository, failover to the second repository occurs.
- No status available for repository or file store on this node.

No action is necessary unless the cluster controller is regularly down or is down for an extended period of time.

If that occurs, take the following actions, in order, until the problem is resolved:

1. Check disk space. If disk space is limited, save the log files (use `tabadmin zip-logs`) in case you need them for Support, then remove unnecessary files (`tabadmin cleanup`).
2. In Windows Task Manager, stop the clustercontroller.exe process tree and let it restart automatically.
3. Restart Tableau Server.
4. Clean up the coordination service (ZooKeeper) files: Stop the cluster (`tabadmin stop`), clean up files (`tabadmin cleanup --reset-coordination`), and then start the cluster (`tabadmin start`).
5. If Cluster Controller continues to show as down, save the log files (`tabadmin zip-logs`) and contact Support.
File Store

File Store status only reflects the state of the file store when the page was loaded.

An active status (✔) with no message indicates that no extracts were being synchronized when the page was loaded. It is possible that the recurring "catch-all" job is running and synchronizing extracts.

Status: Busy; Message: "Synchronizing"

"Synchronizing," usually indicates that extracts were being synchronized across file store nodes when the page was loaded.

However, the "synchronizing" message is also returned following installation (both single-node and multi-node). After Tableau initializes the status should disappear within 15 or 20 minutes.

Status: Down; "Data Extracts unavailable"

On a single-node installation: "Data Extracts unavailable" indicates that existing extracts may be available but publish/refresh will fail. On multi-node installations, this message indicates that extract synchronization will fail for this node.

No action is necessary unless the file store is regularly down or is down for an extended period of time.

If that occurs, take the following actions, in order, until the problem is resolved:

1. Check disk space. If disk space is limited, save the log files (tabadmin ziplogs) in case you need them for Support, and then remove unnecessary files (tabadmin cleanup).
2. Stop the filestore.exe process using Windows Task Manager and let it restart automatically.
3. Restart Tableau Server.
4. Clean up the coordination service (ZooKeeper) files: Stop the cluster (``tabadmin stop``), clean up files (``tabadmin cleanup --reset-coordination``), and then start the cluster (``tabadmin start``).

5. If the file store continues to be down, save the log files (``tabadmin ziplogs``) and contact Support.

**Status: Busy; "Decommissioning"**

This message indicates that this File Store is in read-only mode and that any unique files on this node are being replicated to other file store nodes.

To remove this node, wait until the status message changes to "Ready for removal".

**Status: Active; "Ready for removal"**

This message indicates that the File store is in read-only mode.

You can safely stop (``tabadmin stop``) the cluster and remove Data Engine and/or File Store processes, or remove entire node.

**Status: Active; "Decommission failed"**

This message indicates that the File store is in read-only mode, and that at least one unique file failed to replicate to another file store node.

To resolve a failed decommissioning:

1. Run the `tabadmin decommission` command again.
2. Check disk space on other file store nodes. Decommissioning will fail if another file store node does not have enough space to store all the extracts.
3. Check the `tabadmin.log` file on the primary node and workers for errors.
4. Stop Tableau Server (``tabadmin stop``) and then try running the `tabadmin decommission` command again.
5. Put the file store node back into read/write mode (``tabadmin recommission``), collect logs, and then contact Support.
6. With Support: copy and merge extracts directory from this file store node to the same directory on another file store node.
Repository

**Staus: Busy; Message: "Setting up"**

The "Setting up" message indicates one or more of the following states:

- Passive repository is being synchronized with active repository.
- Repository is not ready to handle failover.
- Repository may have gotten more than two minutes behind active repository and is being setup again (this is faster than waiting for a sync).
- Failover occured and this former active repository is rejoining the cluster.

Wait until the repository status message changes to "Passive".

If this message does not appear, or if it is taking a long time:

1. Check disk space and free space if possible.
2. Check cluster controller logs for errors.
3. Restart node.

**Staus: Busy; Message: "Synchronizing"**

Repository is synchronizing, for example after a failover.

**Staus: Down; Message: n/a**

When the Repository shows a status of down and there is no message, then the Repository is in one of the following states:

- If the installation is configured for high availability, failover of the repository occurred.
- Processes are restarting with updated database connection configurations after failover.
- If another active repository is not available, Tableau Server is down.

Take these actions in the given order until the problem is resolved:

1. Wait several minutes for cluster controller to attempt to restart.
2. Restart Tableau Server (tabadmin restart).
3. Check disk space to make sure there is free space. Collect logs (tabadmin zip-logs) in case you need them for Support, and then cleanup files (tabadmin cleanup).

4. Restart Tableau Server.

5. Stop Tableau Server, collect logs and cleanup coordination service files (tabadmin cleanup --reset-coordination)


7. Collect logs (tabadmin ziplogs) and contact Support.

**Status: Passive; Message: n/a**

A passive status with no message indicates that the node is working as intended and that it is ready for failover if needed.

**VizQL Server**

**Status: Unlicensed; Message: n/a**

For information about unlicensed status for a VizQL Server process, see Handle an Unlicensed VizQL Server Process.

**Troubleshoot Inconsistent Process Status**

**Disclaimer:** This topic includes information about a third-party product. Inclusion of this information is not an endorsement of the product, but is provided as a convenience for our customers. Please note that while we make every effort to keep references to third-party content accurate and up to date, the information we provide here might change without notice as the third-party product changes.

Follow the suggestions to resolve issues with Tableau Server process status. For additional troubleshooting steps based on process status viewed on the Status page, see Troubleshoot Server Processes.
Issue

When Tableau Server is configured with multiple networks cards, the Status page may report inconsistent or inaccurate process status. These potential inconsistencies and inaccuracies can result in other functionality such as alerting or notifications unreliability.

Environment

- Tableau Server 9.0 and higher
- Tableau Server computers with multiple network cards (NICs)

Resolution

To address this problem, you can disable the second NIC, or use the following procedure to assign metrics to each NIC on the computer.

**Note:** Updating DNS or using local routing in the etc\hosts file to refer to the preferred IP address will not resolve this issue.

Assign metrics for each network interface

A metric is a way to indicate the "cost" of using a network interface. The higher the metric, the more expensive it is to use. By default in Windows, Automatic Metric is enabled, but you can manually assign metrics to each network interface to indicate which network interface is preferred. The lower a metric value the more preferred the interface is.

To manually configure metrics for a network interface:

1. In Control Panel, click **Network and Internet**.
2. Click **Network and Sharing Center**.
3. Click **Change adapter settings**.
4. Right-click on a network interface and click **Properties**.
5. Select **Internet Protocol Version 4(TCP/IPv4)** and click **Properties**.
6. On the General tab, click **Advanced**.

7. On the IP Settings tab, clear **Automatic metric** and enter the metric that you want in the **Interface metric** box.

   The metric indicates the cost of using the interface, so give your preferred interface a lower value than the other interface(s) on the computer.

   Repeat the process for any other interfaces, giving them metrics based on their preference. The interface that Tableau Server uses should be the preferred interface and have the lowest value metric. For example, give the preferred network interface a metric of 5 and the secondary interface a value of 10.

**Disclaimer:** Although we make every effort to ensure links to external websites are accurate, up to date, and relevant, Tableau cannot take responsibility for the accuracy or freshness of pages maintained by external providers. Contact the external site for answers to questions regarding its content.

For more information about Windows and using the metric feature for IP routes, see the following Microsoft documentation:

- [https://support.microsoft.com/en-us/kb/299540](https://support.microsoft.com/en-us/kb/299540)

**Troubleshoot Tableau Server Install and Upgrade**

Follow the suggestions in this topic to resolve common issues with Tableau Server. For additional troubleshooting steps based on process status viewed on the Status page, see Troubleshoot Server Processes.

**General Troubleshooting Steps**

Many Tableau Server issues can be addressed with some basic steps:
1. Make sure there is enough disk space on each computer running Tableau Server. Limited disk space can cause a failure to install, a failure to upgrade, or problems running Tableau Server.

2. Restart Tableau Server. Issues related to indexing and processes not fully started can be resolved by restarting Tableau Server in a controlled way. To restart Tableau Server, use the `tabadmin restart` command. This will stop all the processes associated with Tableau Server and then restart them.

3. Clean up files associated with the Coordination Service (ZooKeeper). To clean up Coordination Service files, use the `tabadmin cleanup --reset-coordination` command.

Starting Tableau Server

Tableau Server cannot determine if it fully started

In some instances Tableau Server may report that it could not determine if all components started properly on startup. A message displays: "Unable to determine if all components of the service started properly."

If you see this message after starting, verify that Tableau Server is running as expected by using a `tabadmin status -v` command.

If the status shows as running ("Status: RUNNING"), then the server successfully started and you can ignore the message. If the status is DEGRADED or STOPPED, see "Tableau Server doesn't start" in the next section.

Tableau Server doesn't start

If Tableau Server does not start or is running in a degraded state, run the `tabadmin restart` command from a command prompt. This will shut down any processes that are running, and restart Tableau Server.
Installing Tableau Server

Install fails due to hardware requirements

Starting with version 9.0, Tableau Server cannot install if the computer you are installing on does not meet the minimum hardware requirements. The requirements apply to both primary server computers and worker computers. For details on minimum hardware requirements, see Minimum Hardware Requirements and Recommendations for Tableau Server.

Install or upgrade generates an error when PostgreSQL ODBC driver does not install correctly

In certain circumstances (when a system reboot is pending, or another program is being installed or updated, the Tableau Server PostgreSQL ODBC driver does not install correctly. When this happens, this message displays:

PostgreSQL ODBC driver (64-bit) version 09.03.0400 did not install properly.

**Note:** The version may be different, depending on what version of Tableau Server you are installing.

If this occurs, follow these steps to correct the issue:

1. Check to see if the driver shows as installed in Control Panel.

2. If the driver is not installed, download it from the Tableau Drivers page and install it.

3. If the driver is installed, uninstall it from Control Panel, restart the computer, download the driver, and install it again.
Upgrading Tableau Server

Extract migration is slow

Tableau Server 9.0 introduced a more reliable storage mechanism for data extracts called the File Store. Upgrading from a previous version requires migration of the extracts. This can take a long time (up to several hours) if you have a large number of extracts or extracts that have a lot of data. During migration a message displays:

Migrating extracts to File Store
This process may take up to several hours.

If the migration progress appears to be stalled or stuck, you can verify that migration is continuing by watching the tabadmin.log. An entry is written to this log for each extract that is migrated. You can periodically copy the log and open your copy in a text editor like NotePad to verify that entries are being written to it.

Upgrading fails due to lack of disk space

If there is not enough disk space for the Tableau Server Setup program to run and do the upgrade, the installation will fail. The amount of disk space required will depend on the size of your repository database and the number and size of your extracts. As a part of upgrading to version 9.0, the Setup program migrates extracts to the new File Store and this takes space.

To free up disk space:

1. Zip and save logs using the tabadmin ziplogs command.

   After you create the ziplogs file, save it to a safe location that is not part of your Tableau Server installation.

2. Clean up unnecessary files using the tabadmin cleanup command. For more information, see Remove Unneeded Files
Reindexing Tableau Server Search & Browse

Problems that can be solved by reindexing Search & Browse

Symptoms of an index that needs to be rebuilt include:

- A blank list of sites when a user attempts to log in
- A blank list of projects when a user tries to select a project
- Missing content (workbooks, views, dashboards)
- Unexpected or inaccurate alerts (for example, an "refresh failed" alert on a workbook that does not include an extract)

If you see any of these behaviors, rebuild the Search & Browse index using the `tabadmin reindex` command.

Activating Tableau Server

Tableau Server license activation fails

In some instances Tableau Server license activation may fail with one of the following error messages:

- Function `flxActCommonLicSpcPopulateFromTS returned error 50030, 71521`
- No license found for 'Tableau Server'

To resolve this issue, try these solutions in the order listed:

Confirm you can access the licensing server

The Tableau licensing service was moved to a new data center on October 6, 2018. This means any environments that required special configuration (static IP safe listing for example) to access licensing.tableau.com or licensing.tableausoftware.com will need to be updated before you can activate, refresh, or deactivate a Tableau product key.

Tableau Server needs to connection to the following internet locations for licensing purposes:
- licensing.tableau.com:443
- o.ss2.us
- ocsp.rootg2.amazontrust.com
- ocsp.rootca1.amazontrust.com
- ocsp.sca1b.amazontrust.com
- crt.sca1b.amazontrust.com
- crt.rootca1.amazontrust.com
- ocsp.sca0a.amazontrust.com
- crt.sca0a.amazontrust.com
- ocsp.sca1a.amazontrust.com
- crt.sca1a.amazontrust.com
- ocsp.sca2a.amazontrust.com
- crt.sca2a.amazontrust.com
- ocsp.sca3a.amazontrust.com
- crt.sca3a.amazontrust.com
- ocsp.sca4a.amazontrust.com
- crt.sca4a.amazontrust.com

Requests to the above domains may be on port 80 or 443.

Verify the date and time

Verify the date and time on the primary Tableau Server computer is correct. If the clock is set to a time and date earlier than the current date, Tableau Server cannot be activated.
Verify FlexNet Licensing Service has started

If the date and time on the Tableau Server computer are correct, verify that the FlexNet Licensing Service is running on the primary Tableau Server computer.

1. On the primary computer, from the Windows Start menu, open `services.msc`.

2. In the Services dialog box, verify that the status of `FlexNet Licensing Service 64` (64-bit) or `FlexNet Licensing Service` (32-bit) is **Started**.

   If FlexNet is not listed as **Started**, right-click FlexNet Licensing Service and select **Start**.

   If the **Start** option is grayed out, the service may be set to Disabled. To enable the service:

   a. Right-click FlexNet Licensing Service and select **Properties**.

   b. From the **Startup type** drop-down list, select **Automatic**.

   c. Click the **Start** button, and then click **OK**.

Force the product key to be read again

1. On the primary Tableau Server computer, sign in as administrator and open a command prompt.

2. Change to the Tableau Server bin directory. By default this is:

   ```
   C:\Program Files\Tableau\Tableau Server\10.2\bin
   ```

3. Type the following commands:

   ```
   tabadmin stop
   lmreread
   tabadmin start
   ```
Send the contents of trusted storage to Tableau Support

If FlexNet Licensing Services is installed and running but you’re still seeing an error, there might be a problem with the Tableau product key information. To resolve this issue, complete the following steps to create a file of the key information located in trusted storage.

1. On the primary Tableau Server computer, sign in as administrator and open a command prompt.

2. Change to the Tableau Server bin directory. By default this is:

   C:\Program Files\Tableau\Tableau Server\10.2\bin

3. Type the following command:

   serveractutil -view > LicResults.txt

4. Contact Customer Support (http://www.tableau.com/support/request) and include the LicResults.txt file that you created.

Troubleshoot Desktop License Reporting

When Tableau Server and Tableau Desktop instances are properly configured, Tableau Desktop license usage information is available in two administrative views, Desktop License Usage and Desktop License Expiration. If you can’t see these views, check the requirements below. If you can see the views but there is no data in them, you can troubleshoot by using the Troubleshooting topic in the Desktop Deployment Guide: Troubleshooting license reporting. For details on how to configure Tableau Desktop, see Configure Desktop License Reporting in the Tableau Desktop Deployment Guide.

Administrative views aren’t available

The Desktop License Reporting administrative views are available only to Tableau Server administrators. If you do not see links to the Desktop License Usage and Desktop License Expiration views on the Server Status page (select Manage All Sites from the sites menu), verify the following:
• You are signed in as a Tableau Server administrator.

• You are running a version of Tableau Server 10.0 or later, and users are running Tableau Desktop version 10.0 or later. Desktop License Reporting is available beginning with version 10.0 of Tableau Server and Tableau Desktop.

• Tableau Server has Desktop License Reporting enabled. (The feature is disabled by default.) For more information, see Enable and configure Desktop license reporting.

Troubleshoot Disk Space Usage on Tableau Server Nodes

When available disk space on a Tableau Server primary or worker node is low, performance can be degraded. If free space falls too low, Tableau Server may begin to perform erratically. To monitor free disk space, configure Tableau Server to save disk usage information (this is on by default) and, if desired, enable alerts about low disk space. For more information, see Quick Start: Disk Space Alerts.

**Note:** Disk space monitoring measures free disk space on each server node. Available space may be impacted by programs or processes that are not a part of Tableau Server.

If you find that your Tableau Server installation is running into free disk space limitations, you should take steps to make more space available. This topic suggests some ways you can do that.

Viewing Disk Usage on Tableau Server Nodes

When disk space usage monitoring is enabled (this is the default), server administrators can use the Server Disk Space administrative view to see current disk space usage, and one month of usage data on your Tableau Server nodes. Use this view to help you determine whether one of your server nodes is experiencing a jump in space usage, or if space usage has increased over time.
Cleaning Up Tableau Server-Related Files

To minimize server space used by Tableau Server, you can clean up unnecessary files.

Use the `tabadmin cleanup` command to remove log files, temporary files, and unneeded entries in the PostgreSQL database. If you want to save the logs before you clean them up, you can make an archive. For more information, see Remove Unneeded Files.

Once you have cleaned up log files and temporary files, you may want to use the administrative views to determine which workbooks and data sources are taking up the most space on your server, and whether any of these is not being used. For more information, see Administrative Views.

Identifying and Cleaning Up Other Files

There are a number of tools, like `WinDirStat`, you can use for viewing disk usage and doing cleanup.

Troubleshoot Run As User

As discussed in the topic, Run As User, Tableau Server requires administrative-like access to the machine on which it is installed. Therefore, when you update the Run As User in Tableau Server Configuration, a background process will configure permissions on the Tableau computer for that account. However, in some complex deployment scenarios you may need to verify or manually configure the Run As User permissions on the local Tableau Server computer. Use this section to verify how permissions are configured on the machines running Tableau Server in your deployment. This section also includes procedures that describe how to set permissions and configure security policies for the Run As User.

Required Run As User Account Settings

The Run As User account needs permissions that allows it to modify files and registry settings. In addition, because the Run As User is used as the security context for the Tableau
Server Application Manager service (tabsvc), the account must also be given rights to log on as a service.

These permissions are set automatically when you update the Run As User account in Tableau Server Configuration as described in the topic, Create and Update the Run As User Account.

If you have changed the Run As User account, then we recommend revoking the permissions for the previous account. See Revoke Run As User Account Permissions.

If you have recently changed Run As User or are getting permission errors, use this section to confirm that Tableau Server meets the permission requirements that are detailed here. If you’re running a distributed installation, all Run As User permission configurations must be the same across the primary server and all worker nodes.

**Note:** Do not hide the files created by the Tableau Server installer.

Verify Folder Permissions

The account the Tableau Server service runs under is referred to as the Run As User account. The Run As User account needs permission to specific folder resources on the Windows computer.

This topic provides:

- An accounting of the permissions that are required by the Run As User
- Information about installing Tableau Server in non-default locations.
- How to reapply permissions on an existing Run As User account using the Tableau Configuration Utility

This topic refers to the drive where Windows is installed as the *system drive*. The system drive is equivalent to the Windows environmental variable, %WINDIR%. The drive where Tableau Server is installed is referred to as the *install drive*.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Sys-</th>
<th>File Path</th>
<th>Per-</th>
</tr>
</thead>
</table>

- 1283 -
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>missions required</th>
</tr>
</thead>
<tbody>
<tr>
<td>folder</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>executable</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32\cmd.exe</td>
<td>Read &amp; execute, List folder contents</td>
</tr>
<tr>
<td>Drive root</td>
<td>install</td>
<td>root, for example, Local Disk (C:)</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>folder</td>
<td>install</td>
<td>PROGRAMFILES\Tableau\Tableau Server</td>
<td>Modify</td>
</tr>
<tr>
<td>folder</td>
<td>install (on system drive)</td>
<td>\ProgramData\Tableau\Tableau Server\</td>
<td>Modify</td>
</tr>
<tr>
<td>folder</td>
<td>install (on non-system drive)</td>
<td>\Tableau\Tableau Server\data\</td>
<td>Modify</td>
</tr>
</tbody>
</table>

When you update the Run As User account in the Tableau Server Configuration utility, a background process (tabconfig) will configure the folder permissions on the Tableau computer for the Run As User account that you specify.

In this case, where you are installing on the system drive into the default folder (C:\Program Files\Tableau), the configuration of folder permissions will be handled by the tabconfig process when you update the Run As User account in Tableau Server Configuration. You do
not need to verify or change any folder permissions for this scenario. If you install Tableau Server onto a different drive, you will need to manually configure some permissions.

Installing on non-system drive or in a different folder

If you have installed Tableau Server on a drive other than the system drive, then you will need to configure the system drive to allow the Run As User additional permissions. If you install Tableau Server on a drive other than the system drive, then you will need to configure additional permissions. The following table describes the additional permissions that you need to configure if you install Tableau Server on a drive other than the system drive.

<table>
<thead>
<tr>
<th>Resource</th>
<th>System or install drive</th>
<th>File Path</th>
<th>Permissions required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive root</td>
<td>install</td>
<td>root, for example, D:\</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>folder</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32</td>
<td>Read, List folder contents</td>
</tr>
<tr>
<td>executable</td>
<td>system</td>
<td>SYSTEMROOT:\windows\system32\cmd.exe</td>
<td>Read &amp; execute, List folder contents</td>
</tr>
</tbody>
</table>

This procedure describes how to set permissions for the Run As User on a given folder in Windows. Use this procedure to set the permissions specified in the table above. This procedure shows how to modify permissions where the Windows system drive is the C:\ drive and the Tableau install drive is on D:\.
1. On the computer hosting Tableau Server (and on Tableau Worker nodes, if distributed), use Windows Explorer to right-click the Tableau Server install drive, for example **Local Disk (D:)**, and select **Properties**.

2. In the Local Disk Properties Window, select the **Security** tab.

3. Click **Edit**, then **Add**.

4. In the Select Users, Computers, Service Accounts, or Groups dialog box, type the `<domain>\<username>` for the Tableau Server Run As User account.

5. Click **Check Names** to resolve the account, then **OK** to confirm.

6. With the Tableau Server Run As User account highlighted, select **List folder contents** and **Read**.

7. On the bottom of the **Security** tab, click **Advanced**.

8. In the Advanced Security Settings for Local Disk (C:) window, click **Change Permissions**.

9. In the Advanced Security Settings for Tableau dialog box, highlight the Run As User account and select the **Replace all child object permissions with inheritable permissions from this object** check box.

10. Click **OK** to apply changes to all subfolders and files - this may take a few minutes.

**Note:** You may encounter one or more warning messages from Windows when you apply these changes. For example, a Windows Security warning message will appear that warns that changing permissions on the root directory may reduce security of the computer. In all cases, verify that the warnings are acceptable given the context and continue with the procedure.

11. Click **OK** to confirm changes, then click **OK** in the Local Disk (C:) Properties dialog
box.

12. Follow the steps above to apply the following permissions:
   - Read, List folder contents: \SYSTEMROOT\windows\system32
   - Read & execute, List folder contents: \SYSTEMROOT\windows\system32\cmd.exe

13. Click OK to exit.

   **Note:** In some cases, Windows will display a Recycle Bin error: "The Recycle Bin is corrupted. Do you want to empty the Recycle Bin for this drive?" Click **Yes**.

Reapplying folder permissions

In some organizations, Group Policy or other system management solutions are used to standardize permissions and accounts on application servers. If your organization runs a such a solution, be sure to configure the system to accommodate the folder permissions required by the Run As User account. If the folder permissions for the Run As User account have been changed, you can use Tableau Configuration Utility to reapply the permissions. See Reapplying Permissions.

Verify Registry Permissions

The account the Tableau Server service runs under needs permission to modify the registry on the local machine.

When you update the Run As User in Tableau Server Configuration, a background process (tabconfig) will configure the registry permissions on the Tableau computer for the account you specify. It's unlikely that you will need to apply these permissions manually.

Verify that the Run As User has been granted permissions to the following registry branches. If account that you have specified as the Run As User is a member of the local administrative group or a member of the Domain Admins security group, then the account will not be displayed on the Permissions page.
• HKEY_CURRENT_USER\Software\Tableau

• HKEY_LOCAL_MACHINE\Software\Tableau

Permissions

Tabconfig will grant Read permission and the following Special permissions to these branches:

• Query Value
• Set Value
• Create Subkey
• Enumerate Subkeys
• Notify
• Write DAC
• Write Owner
• Read Control

To view or edit permissions on registry directories:

1. Open the Registry Editor by entering regedit in Windows Run, and then clicking OK.
2. In Registry Editor, navigate to the directory where you want to view or edit permissions. Right-click the directory, and then click Permissions....
3. In Permissions, on the Security tab, select the Run As User account, and then click Advanced.
   If you are adding your Run As User account, then click Add and follow the Windows process for adding a user account to the Security tab. After you have added the account, then select the Run As User account, and then click Advanced
4. In Advanced Security Settings. on the Permissions tab, select the Run As User account, and then click Edit.
5. On the Permission Entry, under Basic permissions, verify that Read and Special permissions are selected. Verify that Only apply these permissions to objects and/or containers within this container is not selected.
6. To view or edit Special permissions, click Show advanced permissions.
7. Under Advanced permissions, verify that the permissions enumerated at the beginning of this topic are selected. Verify that Only apply these permissions to objects and/or containers within this container is not selected.
8. If you have set new permissions, then click **OK** through the multiple windows to finish. If you have viewed permissions and not edited anything, then click **Cancel** to close all windows.

**Verify the Local Security Policy**

After you specify a Run As User account in Tableau Server Configuration (as described in the topic, Create and Update the Run As User Account), a background process (tabconfig) will update the local security policy on the computer running Tableau Server. Tabadmin will update the local security policy to give "log on as a service" permissions to the Run As User account. This elevated policy is required because the Run As User is used as the security context for the Tableau Server Application Manager service (tabsvc).

**Note:** If the Run As User account that you specify in Tableau Server Configuration is a member of the local administrators or a domain administrator, then tabadmin may not update the local security policy. Updating the Run As User with an account that is a member of local administrators or domain administrators is not a good security practice. We recommend using a domain User account for the Run As User.

In some cases, you may need to manually set security policy for your Run As User. For example, some organizations run Windows Group Policy that remove "Log on as service" rights that have been set on user accounts. Or an organization may run a policy that creates a permission conflict by specifying "Deny log on as a service." If your organization does this, then you will need to disable or edit such Group Policies so that your Run As User account is not affected.

The following procedure describes how to configure security policy, **Log on as service**, manually. You can also use the procedure below to verify that your Run As User is appropriately configured with local security policy rights. For example, you should verify that the Run As User account is not specified on the **Deny log on as service** policy.

If you are running a distributed installation, then configuration must be the same across the primary and all worker nodes.
To verify or update the local security policy:
2. In Local Security Policy, open Local Policies, select User Rights Assignments.
To verify or set Log on as a service policy:
a. Right-click Log on as a service policy and then click Properties.

b. In Log on as a service Properties , click Add User or Group.
c. Type the <domain>\<username> for the Tableau Server Run As User
account (for example: MYCO\tableau_server), and click Check Names.

d. When the account resolves correctly, it is underlined. Click OK.

- 1290 -


To verify Run As User account is not specified in the Deny log on as a service policy:

a. Right-click **Deny log on as a service** policy, and then click **Properties**.
b. In **Deny log on as a service Properties**, verify that the Run As User account is not listed. If it is, remove it. When you are finished, click **OK**.

3. Click **OK** to close the Local Security Settings windows.

**Verify Tableau Service Settings**

Confirm that Tableau services are assigned the correct Log On and Startup values. If you are running a **distributed installation** of Tableau Server, perform these steps on the workers as well as on the primary.

1. Log on as administrator to the computer running Tableau Server.

2. On the Tableau Server computer, select **Start > Control Panel > Administrative Tools > Computer Management > Services and Applications > Services**.

3. Open Services and Applications, then click **Services**. Confirm that the following services have the correct settings:

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Logon Value</th>
<th>Startup Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLEXnet Licensing Service</td>
<td>Local System</td>
<td>Automatic</td>
</tr>
<tr>
<td>Secondary Logon</td>
<td>Local System</td>
<td>Automatic</td>
</tr>
<tr>
<td>Tableau Server Application Manager (tabsvc)</td>
<td>&lt;domain&gt;&lt;username&gt; This is the Run As User account. See below. If you have not specified a Run As User account, then Network Service account is used.</td>
<td>Automatic</td>
</tr>
<tr>
<td>Tableau Server License Manager</td>
<td>Local Service</td>
<td>Automatic</td>
</tr>
<tr>
<td>Service Name</td>
<td>Logon Value</td>
<td>Startup Value</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>(tablicsrv)</td>
<td>The License Manager relies on default Windows folder permissions that are applied to the Local Service. If you are seeing licensing errors in the tabadmin log files, then you may need to modify permissions on the Tableau installation directory. See Verify Folder Permissions for more information.</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Do not change the default settings on the **Recovery** tab of the **Tableau Server Application Manager Properties** dialog box; leave the settings for failure recovery as **Take No Action**. If you change these settings, Tableau Server will restart after being stopped via the **tabadmin** command or **Stop Tableau Server** command.

Changing the Log On Value

To change the **Log On** value for Tableau Server (tabsvc) to the Run As User account:

1. Select **Start > All Programs > Tableau Server > Stop Tableau Server**.
2. Select **Start > All Programs > Tableau Server > Configure Tableau Server**.
3. On the General tab, enter the domain, user name, and password for Tableau Server’s Run As User account.
4. Click **OK**, and then select **Start > All Programs > Tableau Server > Start Tableau Server**.
Revoke Run As User Account Permissions

Changing the Run As User account in Tableau Sever Configuration Utility does not remove the permissions from the previous account. Therefore, after you change the Run As User account, we recommend manually revoking permissions from the previous account as a secure best practice. Follow the procedure below to revoke permissions from the previous Run As User account.

If you have changed your Run As User account and your organization uses a forward proxy solution, then you may need to reconfigure the local LAN settings with the new Run As User account. See Configure a forward proxy server for more information.

You must be logged onto the Tableau Server computer with an administrator account to perform the following procedures.

Remove folder permissions

Tableau Server configures permissions on Windows folders according to the location where you install Tableau Server. Before you remove folder permissions, review Verify Folder Permissions to identify the resources for which you will need to remove permissions. Run the following procedure for each of the resources you have identified:

1. For each resource (drive, folder, executable), right-click the resource, and then click Properties.
2. On the resource property page, click the Security tab, and then click Edit to change permissions.
3. On the Permissions page, select the previous Run As User account and then click Remove.
4. Click OK.

Remove registry permissions

Remove the previous Run As User account from the following registry locations:

- HKEY_CURRENT_USER\Software\Tableau
- HKEY_LOCAL_MACHINE\Software\Tableau
**Warning:** Editing the Windows registry incorrectly can have harmful effects on your computer.

1. Open the Registry Editor by entering `regedit` in Windows Run, and then clicking OK.
2. For each registry directory, right-click the Tableau folder, and then click Permissions.
3. In the Permissions for Tableau page, select the previous Run As User account, and then click Remove.
4. Click OK.

Remove security policies

Remove the previous Run As User account from the following security policies:

- “Log on as service” policy
- “ Allow log on locally” policy

1. Select **Start > Control Panel > Administrative Tools > Local Security Policy.**
2. In Local Security Policy, open Local Policies, select User Rights Assignments.
3. For each policy:
   a. Right-click the policy and then select Properties.
   b. On the policy property page, select the previous Run As User account, and then click Remove.
   c. Click OK.

**Command Line Utilities**

**tabadmin**

You can perform certain administrative tasks and change Tableau Server configuration settings using the tabadmin command line tool. It installs with Tableau Server by default and cannot be installed on other computers.
**Note:** You should only run tabadmin on the primary Tableau Server node, not on worker nodes.

How to use tabadmin

The first step to using tabadmin is to open a command prompt as an administrator:

![Command Prompt]

Next, navigate to Tableau Server's bin directory by entering the following:

```bash
cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
```

You're now ready to enter tabadmin commands.

**Change Tableau Server's Configuration from the Command Line**

When you enter a command that changes the server's configuration (a `tabadmin set` command for example), you need to follow a sequence of commands:

1. Stop the server before issuing the command.

2. Enter the appropriate command to make the configuration change.
3. Run `tabadmin config` to push the change out to all of the server's configuration files.

4. Start Tableau Server again.

Example

Change the server's configuration using the `tabadmin set` command:

```
tabadmin stop
```
```
tabadmin set [option-name value]
```
```
tabadmin config
```
```
tabadmin start
```

Display Command Line Help

Use the `tabadmin` built-in help to get a quick description of a command.

To display help for all `tabadmin` commands enter:

```
tabadmin help commands
```

To see help for a specific command, enter `tabadmin help <command>`. For example:

```
tabadmin help set
```

`tabadmin` Commands

**Note:** You should only run `tabadmin` on the primary Tableau Server node, not on worker nodes.

Here are the commands that can be used with the `tabadmin` command line tool:

- `activate`
- `administrator`
- `assetkeys`
- `autostart`
- `backup`
cleanup
clearcache
configure
customize
dbpass
decommission
delete_webdataconnector
exportsite
failoverprimary
failoverrepository
get
get_openid_redirect_url
importsite
importsite_verified
import_webdataconnector
licenses
list_webdataconnectors
manage_global_credentials
passwd
recommission
regenerate_internal_tokens
register
reindex
reset
reset_openid_sub
restart
restore
set
sitestate
start
status
stop
validate
verify_database
warmup
whitelist_webdataconnector
activate

Activates or returns a Tableau Server license online or offline.

Examples

Activate a license offline:

```
tabadmin activate --tlf <file.tlf>
```

Return a license offline:

```
tabadmin activate --tlr <file.tlr>
```

Activate a license online:

```
tabadmin activate --activate --key <license>
```

Return a license online:

```
tabadmin activate --return --key <license>
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--tlf</td>
<td>FILE</td>
<td></td>
<td>For offline activation. If you are offline during Setup, you are prompted to save a .tlq file, which you submit to Tableau. Tableau sends you a .tlf file. You use this .tlf file to activate Tableau Server.</td>
</tr>
<tr>
<td>--tlr</td>
<td>FILE</td>
<td></td>
<td>For offline return (deactivation). The file you use as the argument is the .tlr file that you receive from Tableau.</td>
</tr>
</tbody>
</table>
### Option (short) | Option (long) | Argument | Description
---|---|---|---
--key | PRODUCTKEY | For online activation or return from the command line.
--trial | | For a trial license.
--activate | | Activate the specified license. Use with --tlf, --asr, --key or --trial.
--return | | Return the specified license. Use with --tlr or --key.

**See Also**

**Activate Tableau Server Offline**

**administrator**

Grants or removes the system administrator capability to the named user. This command does not apply to site administrators.

**Examples**

Remove the system administrator capability from user hwilson:

```
tabadmin administrator hwilson false
```

Give the system administrator capability to user jsmith:

```
tabadmin administrator jsmith true
```
assetkeys

Creates a new key to encrypt sensitive information, such as credentials for external databases, stored within the Tableau repository, which is a PostgreSQL database that Tableau Server uses internally. The key you create with this command can contain either a passphrase that you specify or one that's randomly generated.

Keys are generated with AES symmetric encryption. AES uses a block length of 128 bits. Tableau Server uses a 256-bit key length.

**Note:** Tableau Server must be running when you issue this command.

If you specify your key’s passphrase, it’s a best practice for it to be at least eight characters long. You should also take character sets into consideration. A strong passphrase should contain characters from at least three of the following character sets:

- Lowercase a-z
- Uppercase A-Z
- Digits 0-9
- Non-alphabetic characters

The new key is encrypted and stored in the following key file: `asset_keys.yml` (ProgramData\Tableau\Tableau Server\data\tabsvc\config). If the key file is lost or corrupted, you can use the `assetkeys --validate` command to recreate it.

If you use the assetkeys command then later create and restore a backup file (.tsbak), you will need to run the `tabadmin assetkeys --validate` command after restoring the backup file. By design, backup files do not contain custom encryption keys—even though some data may be encrypted with them. This protects the encrypted values in case the backup file falls into the wrong hands. When you run `tabadmin assetkeys --validate` after a backup restore, you are prompted to enter the key’s passphrase.
Examples

Have Tableau Server generate a key and passphrase for you:

tabadmin assetkeys --auto_create

Generate a key using a passphrase that you specify. You are prompted to enter a pass-
phrase, which will not be displayed as you type:

tabadmin assetkeys --create

Use the contents of a file as the passphrase:

tabadmin assetkeys --create_from_file C:\test\key\password.txt

Confirm that the key file asset_keys.yml in ProgramData\Tableau\Tableau Server-
data\tabsvc\config is valid and consistent with the metadata in the Tableau Repository:

tabadmin assetkeys --validate

Recreate the file asset_keys.yml which is now corrupted or missing from Pro-
gramData\Tableau\Tableau Server\data\tabsvc\config:

tabadmin assetkeys --validate

You will be prompted for the passphrase.

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
</table>
| --auto_create  |               | [length] | Generates a random passphrase to generate the key. Takes an optional argument for the length of the passphrase. You should record the passphrase and keep it in a safe place, as it will be required by --val-
<p>|                |               |          | idate if assetkeys.yml is lost or corrupted. |
| --create       |               |          | Generates a key using the passphrase you provide. You are prompted for the passphrase and it will not display as you type it. Your passphrase should be at least 10 characters long and not based on words |</p>
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>found in the dictionary.</td>
</tr>
<tr>
<td>--create_from_file</td>
<td>FILE</td>
<td></td>
<td>Generates a key using the contents of a file that you provide as the passphrase.</td>
</tr>
<tr>
<td>--validate</td>
<td></td>
<td></td>
<td>Confirms that all asset keys being used internally by Tableau Server are up-to-date. If you lose the asset_keys.yml file (for example, due to file corruption), you can use the --validate option to recreate it. You are prompted for and must enter the passphrase that was used to generate the current asset keys in order to successfully recreate the key file.</td>
</tr>
</tbody>
</table>

See Also

Security

autostart

Specifies whether Tableau Server starts at system start-up time. By default, Tableau Server starts when the computer on which it's installed starts. If autostart is set to off, the tabsvc service will not start (other processes will start) and you will need to explicitly start Tableau Server either using tabadmin start or the Start menu.

After changing the autostart value, you need to run a tabadmin config command to update configuration files on all Tableau Server nodes.

tabadmin autostart [on | off]
Example

Display Tableau Server’s auto-start status:

```
tabadmin autostart
```

Start Tableau Server when the operating system starts:

```
tabadmin autostart on
```

Do not start Tableau Server when the operating system starts:

```
tabadmin autostart off
```

backup

Creates a backup of the data managed by Tableau Server. This data includes Tableau’s own PostgreSQL database, which contains workbook and user metadata, data extract (.tde) files, and configuration data. If you have imported web data connectors using the `import_webdataconnector` command, the backup process saves copies of the connectors as well. You do not need to stop Tableau Server before you create a backup file.

By default, the backup file is saved in the Tableau Server `\bin` directory, where you run the `tabadmin backup` command. You can specify a particular location by including a full path with the backup file name. You can also use the `--userdir` option to put the backup file into a known location.

**Note:** The command adds the `.tsbak` extension to the file name that you specify unless the name already contains that extension.

Examples

Create a backup file in the current directory named `tabserv.tsbak`: 

```
tabadmin backup
```
tabadmin backup tabserv.tsbak

Create a backup file in the C:\backups\tableau folder named tabserv.tsbak:

```
tabadmin backup C:\backups\tableau\tabserv.tsbak
```

Append the current date to the backup file name and put temporary files created during the backup process in C:\mytemp\tableau. The backup file tabserv.tsbak is created in the directory where you are running the command from:

```
tabadmin backup tabserv.tsbak -d -t C:\mytemp\tableau
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-d</code></td>
<td><code>--date</code></td>
<td></td>
<td>Appends the current date to the backup file name. Date is based on Coordinated Universal Time (UTC).</td>
</tr>
<tr>
<td><code>-u</code></td>
<td><code>--user-dir</code></td>
<td></td>
<td>Places the backup file in the ProgramData\Tableau\Tableau Server folder.</td>
</tr>
<tr>
<td><code>-t</code></td>
<td><code>--temp-dir</code></td>
<td>PATH</td>
<td>Specifies the location for temporary files created during the backup or when verifying database integrity.</td>
</tr>
<tr>
<td><code>-v</code></td>
<td><code>--verify</code></td>
<td></td>
<td>Verifies the integrity of the database. Available beginning with version 9.3.</td>
</tr>
<tr>
<td></td>
<td><code>--no-config</code></td>
<td></td>
<td>Creates a backup file without configuration data. The secrets storage configuration bundle is not included in the backup file.</td>
</tr>
</tbody>
</table>

See Also

Back Up Tableau Server Data
cleanup

Reduces the disk space consumed by Tableau Server. Running `tabadmin cleanup` removes log files, temporary files, and select rows in Tableau Server’s PostgreSQL database. If Tableau Server is installed on multiple computers in a cluster, the command can also reset the information maintained by the coordination server that is used to synchronize between nodes and to manage failover.

The effect of the `cleanup` command depends on whether the server is running or stopped. For more information, see Remove Unneeded Files.

**Examples**

Remove log files, temporary files, and HTTP request entries in the PostgreSQL database:

```
tabadmin cleanup
```

Remove log files and temporary files (leave HTTP request entries in the database untouched):

```
tabadmin cleanup --restart
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r</td>
<td>--restart</td>
<td></td>
<td>Stops Tableau Server, runs the cleanup command, and starts the server again.</td>
</tr>
<tr>
<td></td>
<td>--reset-coordination</td>
<td></td>
<td>In addition to performing a normal cleanup, removes log files, transaction logs, and snapshots that are maintained</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>by the Tableau Server coordination service (zookeeper) when Tableau Server is running on multiple computers in a cluster. Note that using this option completely resets the coordination service, meaning all state maintained by the coordination service is removed. This option also does the equivalent of a <code>tabadmin configure</code> command. For guidelines about when to reset the coordination service, see Troubleshoot Server Processes.</td>
</tr>
</tbody>
</table>

See Also

Remove Unneeded Files
clearcache

Clears the information being cached by the Cache Server process (redis-server.exe). The cache stores information used to render views in order to help speed rendering. Clearing the cache is useful if metadata about views or data sources that might be cached has changed, and those changes should take effect before the resource is removed from the cache in the normal course of server processing. For example, clearing the cache can be useful if you change permissions on a workbook or view and it's important that the changed permissions take effect immediately.

You must stop the server before you run this command.

Examples

tabadmin clearcache

See Also

Tableau Server Processes

configure

Updates Tableau Server’s configuration by forcing an update to all the files in ProgramData\Tableau\Tableau Server\data\tabsvc\<area>. This update includes refreshing the master service configuration file, workgroup.yml (ProgramData\Tableau\Tableau Server\data\tabsvc\config). When you make a configuration change, it’s a best practice to run tabadmin configure (or tabadmin config) to ensure that all files affecting the server’s configuration are completely updated.

If you are running Tableau Server in a distributed environment and if you have imported web data connectors using the import_webdataconnector command or deleted them using the delete_webdataconnector command, the configure command makes
sure that any web data connectors are correctly distributed (imported or deleted) in all nodes where the gateway process is running.

**Examples**

```
tabadmin configure
```

```
tabadmin config
```

**See Also**

Reconfigure the Server

```
set
```

```
tabadmin set options
```

customize

Customizes the server name that's displayed in tooltips and messages, and the logos that are used by Tableau Server. Note that even if you use this command, the bottom of every server page lists Tableau's copyright information.

Image files you use for logos can be in GIF, JPEG, or PNG format.

**Examples**

**Name**

Change the product name used in tooltips from "Tableau Server" to "My Company":

```
tabadmin customize name "My Company"
```

Reset the product name to the default:

```
tabadmin customize name -d
```
Header logo

Customize the main server header logo. The image can be up to 160 by 160 pixels, but not smaller than 32 by 32 pixels. For best results use an image that’s 125 by 35 pixels. If the image is larger than 160 by 160 pixels, it is clipped.

```
tabadmin customize header_logo "C:\My Pictures\example.png"
```

Reset the header logo to the default:

```
tabadmin customize header_logo -d
```

Sign-in logo

Customize the sign-in page logo. The image can be up to 3000 by 3000 pixels.

```
tabadmin customize sign_in_logo "C:\My Pictures\example.png"
```

Reset the sign-in logo to the default:

```
tabadmin customize sign_in_logo -d
```

Small logo

Customize the web authoring header logo. The image can be up to 32 by 32 pixels. For best results use an image that’s 32 by 32 pixels.

```
tabadmin customize smalllogo "C:\My Pictures\example.png"
```

Reset the header logo to the default:

```
tabadmin customize smalllogo -d
```

Logo

Set the main server header and the sign-in page logo to the same image. The image can be up to 160 by 160 pixels, but not smaller than 32 by 32 pixels. If the image is larger than 160 by 160 pixels, it is clipped.
tabadmin customize logo "C:\My Pictures\example.png"

Reset the logo to the default:

```
tabadmin customize logo -d
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-d</td>
<td>--default</td>
<td>name</td>
<td>header_logo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sign_in_logo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>smalllogo</td>
<td>logo</td>
</tr>
<tr>
<td>name</td>
<td>NAME</td>
<td>Set the name to the value in the argument. The default is &quot;Tableau Server&quot;.</td>
<td></td>
</tr>
<tr>
<td>logo</td>
<td>FILE</td>
<td>Set both the header logo and the sign-in page logo to the image referenced in the file path. If the image is larger than 160 by 160 pixels, it is clipped.</td>
<td></td>
</tr>
<tr>
<td>header_logo</td>
<td>FILE</td>
<td>Set the logo to the image referenced in the file path. For best results use an image that's 125 by 35 pixels. If the image is larger than 160 by 160 pixels, it is clipped.</td>
<td></td>
</tr>
<tr>
<td>sign_in_logo</td>
<td>FILE</td>
<td>Set the logo to the image referenced in the file path. The image can be up to 3000 by 3000 pixels.</td>
<td></td>
</tr>
<tr>
<td>smalllogo</td>
<td>FILE</td>
<td>Set the logo to the image referenced in the file path. For</td>
<td></td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>best results use an image that's 32 by 32 pixels.</td>
</tr>
</tbody>
</table>

See Also

Change the Name or Logo

dbpass

Enables external access to Tableau's PostgreSQL database (the repository). After you use the dbpass command to allow access to the database, you can connect to and query it using Tableau Desktop to create your own administrative views.

```
tabadmin dbpass [--disable] [--username <username>] [password]
```

**Note:** The `--username` option is valid starting with Tableau Server 8.2.5. In earlier versions dbpass only enabled the "tableau" user and you could not specify the user. 8.2.5 added a second user called "readonly" and introduced the ability to specify the user you are enabling access for.

**Examples**

Enable access for the `tableau` user and set the password to `p@ssword`:

```
tabadmin dbpass p@ssword
```

Enable access for the `readonly` user and set the password to `p@ssword`:

```
tabadmin dbpass --username readonly p@ssword
```

Disable external access for the default (tableau) user:
tabadmin dbpass --disable

or

tabadmin dbpass --disable --username tableau

Disable external access for the readonly user:

tabadmin dbpass --disable --username readonly

<table>
<thead>
<tr>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--disable</td>
<td></td>
<td>Disable external access to Tableau's PostgreSQL database for the default remote user (tableau) or, starting in 8.2.5, if a user name is specified, disable remote access for that user.</td>
</tr>
<tr>
<td>--username</td>
<td>tableau or readonly</td>
<td>Change the password for the specified user, or, if used with the --disable option, disable access for the specified user. Options for users are tableau and readonly. This option is valid in Tableau Server 8.2.5 or higher.</td>
</tr>
<tr>
<td></td>
<td>password provided by user</td>
<td>Enable remote access to Tableau's PostgreSQL database for the default remote user (tableau) or, starting in 8.2.5, if a user name is specified, enable access for that user with the given password.</td>
</tr>
</tbody>
</table>

See Also

Collect Data with the Tableau Server Repository
decommission

Prepares Tableau Server File Store nodes for removal from the distributed installation. This command puts the specified nodes into read-only mode so new content cannot be added to the File Store, and makes sure that all content on the node also exists on another File Store node. This command can be run while Tableau Server is running.

**Note:** Remove a decommissioned File Store node before restarting Tableau Server. Restarting automatically re-activates any decommissioned File Store nodes.

tabadmin decommission <node1 node2 ...>

**Examples**

Decommission worker2:

tabadmin decommission worker2

Decommission two nodes by IP address:

tabadmin decommission 10.32.139.30 10.32.139.22

<table>
<thead>
<tr>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;node1 node2 node 3...&gt;</td>
<td>List of File Store nodes (servers) to decommission. Separate multiple nodes with a space.</td>
</tr>
</tbody>
</table>

See Also

Distributed Environments

Maintain a Distributed Environment
delete_webdataconnector

Removes the specified web data connector from the server, or removes all web data connectors. If the web data connector is installed on a cluster, this command removes the specified connector or all connectors from all computers in the cluster.

**Note:** If the server is running in a distributed environment and the delete process is partially successful, users can still access the connector. For more information, see Web Data Connectors in Tableau Server.

**Examples**

```shell
tabadmin delete_webdataconnector connector1.html
```

```shell
tabadmin delete_webdataconnector --all
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--all</td>
<td></td>
<td>Removes all web data connectors from Tableau Server. When you use this option, you do not specify a connector name. If the server is configured as a cluster, the command removes all connectors from all the nodes where they are installed.</td>
</tr>
</tbody>
</table>

See Also

import_webdataconnector

list_webdataconnectors

Web Data Connectors in Tableau Server

Tableau webdataconnector page on GitHub
exportsite

Exports a Tableau Server site, including its users, workbooks, projects, extracts, and data connections, and places it in a file with a .zip file extension. You can then use the exported site file to provision a new site by using the `importsite` and `importsite_verified` commands.

You don't need to stop Tableau Server before you use the `exportsite` command. Tableau Server will lock the site being exported during the export process.

**Notes**: When you import a site that you exported earlier, each user and schedule that is being imported must match an existing user and schedule. For suggestions about how to manage the export and import process to match users and schedules, see Tips for importing to a target with fewer users or schedules than the source site.

If your source site has workbooks that use published data sources, the target site name must match the source site name. The data connections for the workbooks will continue to refer to the source site name and can't be updated on the new site.

**Examples**

```bash
  tabadmin exportsite <site ID> --file <PATH>

  or

  tabadmin exportsite <site ID> --file <FILE>
```

Export the site whose site ID is `finance` to a file named `finance_export.zip` and place it in `Program Files\Tableau\Tableau Server\10.2\bin`:

```bash
  tabadmin exportsite finance --file finance_export
```

Export the Default site. The site ID for the Default site is "" (double quotes, no space).
If you are using Windows PowerShell to run the command, enclose the double quotes for the Default site within single quotes ('"''). For example: `tabadmin exportsite '"' --file finance_export`

Export the Default site to a file named `finance_export.zip` and place it in C:\temp\exported sites instead of in the Tableau Server bin directory. Because the path contains a space, it's contained by quotes:

`tabadmin exportsite '"' --file "C:\temp\exported sites\finance_export"

Export the site whose site ID is `finance`, name the export site file `financesite.zip`, place the file in C:\sites\exported, and write temporary run-time files to C:\temp_files:

`tabadmin exportsite finance --file C:\sites\exported\financesite --tempdir C:\temp_files`

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file</td>
<td></td>
<td>FILE or PATH</td>
<td>The name or name and location (path) of the exported site file to be created. If you don't specify a path, Tableau Server's bin directory is the assumed location (Program Files\Tableau\Tableau Server\10.2\bin).</td>
</tr>
<tr>
<td>--tempdir</td>
<td></td>
<td></td>
<td>The location of temporary files created during export. Use this option if you don't have write access to the Tableau Server installation directory. This option does not determine where the export site file is created.</td>
</tr>
</tbody>
</table>
failoverprimary

Identifies a second installation of the primary Tableau Server as the backup primary, or if the primary has failed, identify the backup primary as the new primary and the former primary as the new backup.

**Note:** If you run this command without providing an option, the current computer is assumed to be the primary and no backup primary is identified.

**Example**

```
tabadmin failoverprimary --primary "<computer name(s) or IPv4 address(es)>"
```

The following command specifies the primary Tableau Server computer (10.32.139.22) and the backup primary (10.32.139.50):

```
tabadmin failoverprimary --primary "10.32.139.22,10.32.139.50"
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-- primary</td>
<td>-- primary</td>
<td>Computer name(s) or IPv4 address(es)</td>
<td>The Tableau Server machine that's acting as the cluster's primary.</td>
</tr>
</tbody>
</table>
See Also

High Availability

Configure for Failover and Multiple Gateways

Use a Backup Primary

\texttt{failoverrepository}

Manually identifies a second, passive installation of the PostGRES repository as the active repository.

If Tableau Server is configured for high availability, failover of the repository is automatic. Use the \texttt{failoverrepository} command to manually fail over the repository (for example, if Tableau Server is configured for manual repository failover using the \texttt{tabadmin set clustercontroller.pgsq1.failover false} command).

Tableau Server must be running when you run the \texttt{failoverrepository} command.

\texttt{tabadmin failoverrepository --target <computer name or IPv4 address> | --preferred}

Example

\texttt{tabadmin failoverrepository --target worker\_server2}

\textbf{Note:} This command is persistent. The failover repository remains the active repository until you issue the command again. If you have a preferred active repository configured, use the \texttt{--preferred} option to switch back to that repository.
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--target</td>
<td>Computer name or IPv4 address</td>
<td>The Tableau Server repository node to failover to.</td>
<td></td>
</tr>
<tr>
<td>--preferred</td>
<td></td>
<td>Failover to the repository node that is specified as the preferred active repository.</td>
<td></td>
</tr>
</tbody>
</table>

See Also

High Availability

Configure for Failover and Multiple Gateways

Use a Backup Primary

get

Get the value of a Tableau Server configuration option.

Example

```
tabadmin get [option-name]
```

Get the backgrounder query limit:

```
tabadmin get backgrounder.querylimit
```
get_openid_redirect_url

If Tableau Server is configured to use OpenID Connect for authentication, gets the URL that is used to redirect users from the identity provider (IdP) to Tableau Server after a successful sign-in.

Example

tabadmin get_openid_redirect_url

See Also

OpenID Connect

Configure Tableau Server for OpenID Connect

importsite

Imports a site into Tableau Server. The importsite command is the first of two commands you use to import a site into Tableau Server. To run this command, you need the following:

- **An exported site file.** Tableau Server administrators create this file using the exportsite command. If you have a site on Tableau Online and you want to import it into your own on-premises installation of Tableau Server, request an exported site file from Tableau Customer Support.

- **The site ID for the target site.** The target site is the Tableau Server site into which you want to import. The target site must already exist when you run the importsite command; you can't create it as part of the command. The site ID for Tableau Server's default site is "" (double quotes, no space).
The contents of the site that you import will replace (not amend) the contents of the target site. For example, if your target site has a workbook named `MyDashboard.twbx` and the site you are importing does not have this workbook, the import process will remove `MyDashboard.twbx` from the target site.

When you run the `importsite` command, the command creates a temporary directory containing mapping files in comma-separated-value (CSV) format that define how the exported site’s assets (users, workbooks, projects, extracts, and data sources) will be mapped when the site has been imported. It is important that you verify these details. Use a text editor or Microsoft Excel to open the mapping files and make any changes. Any entries with `???(question marks)` represent mappings that couldn’t be handled and must be edited. After you verify the mappings, finish the import process using the `importsite_verified` command.

**Note:** When you import a site that you exported earlier, each user and schedule that is being imported must match an existing user and schedule. For suggestions about how to manage the export and import process to match users and schedules, see Tips for importing to a target with fewer users or schedules than the source site.

**Examples**

```
  tabadmin importsite <site ID> --file <PATH>
```

or

```
  tabadmin importsite <site ID> --file <FILE>
```

Import the file `sales_site.zip` located in `C:\tableau\exported` to a site whose site ID is `wsales`:

```
  tabadmin importsite wsales --file C:\tableau\exported\sales_site.zip
```
Import the file sales_site.zip, which is located in C:\Program Files\Tableau\Tableau Server\10.2\bin, to the Default site. The site ID for the Default site is "" (double quotes, no space).

tabadmin importsite "" --file sales_site.zip

The mapping files for you to verify are placed in ProgramData\Tableau\Tableau Server\data\tabsvc\temp\import_<site ID>_<datetime>_mappings. To specify a different directory, use the --tempdir option.

Place the files to be verified in C:\temp\site_to_import:

Skip the verification step (not recommended):

tabadmin importsite wsales --file "C:\tableau\exported\sales_site.zip" -no-verify

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file</td>
<td>--file PATH</td>
<td>The name and location of the exported site file you are importing. If you don't specify a path, Tableau Server's bin directory is the assumed location (Program Files\Tableau\Tableau Server\10.2\bin).</td>
<td></td>
</tr>
<tr>
<td>--no-verify</td>
<td></td>
<td>Skips the verification step and imports the exported site file directly to its new location in your Tableau Server installation. If you choose this option, you do not need to use the importsite_verified command.</td>
<td></td>
</tr>
<tr>
<td>--tempdir</td>
<td>--tempdir PATH</td>
<td>The directory where you will verify that the site files</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Importing a site without verifying the mappings is not recommended.
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pdir</td>
<td></td>
<td></td>
<td>have the correct mappings. If you don’t specify this option, files are placed in a directory under ProgramData\Tableau\Tableau Server-data\tabsvc\temp.</td>
</tr>
</tbody>
</table>

See Also

Import or Export a Site

importsite_verified

Performs the second part of an import process for a site on Tableau Server. Before you can use importsite_verified, you must first use importsite.

The importsite_verified command reads from a directory containing CSV files that you have verified, and imports a new site into Tableau Server based on how the site’s assets are mapped in the CSV files. The site that receives the import (the target site) must already exist on Tableau Server.

During the import process, Tableau Server locks the site receiving the import.

Examples

`tabadmin importsite_verified <target site ID> --importjobdir <PATH>`

Import files from the directory C:\temp\site_to_import to the site whose site ID is esale:
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--import-jobdir</td>
<td></td>
<td>PATH</td>
<td>The directory containing CSV files whose mappings you have verified. If the path has a space in it, enclose the entire path in quotes.</td>
</tr>
</tbody>
</table>

See Also

Import or Export a Site

import_webdataconnector

Installs a web data connector on the server. Users who create workbooks can then reference the web data connector as a data source.

**Note:** Starting with version 10.0 of Tableau Server, the recommended way to make web data connectors available on Tableau Server is to add them to a safe list. For more information, see tabadmin Commands.

**Important:** Before you import a web data connector, make sure that the JavaScript code in the connector does not implement any functionality that should not be on your server.

When the `import_webdataconnector` command finishes importing the connector, the command displays the server URL of the connector. When users want to reference the web data connector as a data source, they need to know this URL. (You can also view the URLs of connectors on your server by using the `list_webdataconnectors` command.)
If the web data connector includes references to an external file, such as to a .css file or .js file, you must make sure that the external file is available from the server, either over the web or as a local file. If the connector references a local file, the local file must be in the same folder as the connector’s .html file relative paths to subdirectories are not supported for imported web connectors. (Make sure that the <link> or <script> element in the connector correctly references the file as a peer of the connector file.) If the external file is local, you must use the import_webdataconnector command to import the external file separately.

If the server includes multiple computers in a cluster, the web data connector is imported to each computer where a gateway process is running.

Examples

```
tabadmin import_webdataconnector connector1.html

tabadmin import_webdataconnector c:\web-dataconnectors\connector1.html --overwrite

tabadmin import_webdataconnector \\my-share\webdataconnectors\connector2.html --overwrite

tabadmin import_webdataconnector connector1.css
```

**Note:** The connector name can contain only these characters: a-zA-Z0-9 ()_.

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--overwrite</td>
<td>--overwrite</td>
<td></td>
<td>Overwrites any existing file on the server that has the same name as the file that you are importing.</td>
</tr>
</tbody>
</table>
See Also

dele te_webdataconnector

list_webdataconnectors

Web Data Connectors in Tableau Server

licenses

Displays license information for Tableau Server.

Examples

tabadmin licenses

tabadmin licenses -p

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-p</td>
<td>--processor_cores</td>
<td></td>
<td>Display the physical core count for the current machine.</td>
</tr>
</tbody>
</table>

list_webdataconnectors

Displays the names or URLs of web data connectors that are installed on the server.

Examples

List the names of the web data connectors.
tabadmin list_webdataconnectors

List the URLs of the web data connectors.

tabadmin list_webdataconnectors --urls

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--urls</td>
<td></td>
<td>Specifies that the command should list URLs instead of names.</td>
</tr>
</tbody>
</table>

See Also

import_webdataconnector
delete_webdataconnector

Web Data Connectors in Tableau Server

manage_global_credentials

Manages credentials for delegated data access on Tableau Server. Use this command to specify the credentials for a proxy user that is used to access a data source that does not support single-sign on via Kerberos.

Examples

```
  tabadmin manage_global_credentials --add --server <server> --user <username> --password <password>
```

Add credentials for a server named my-server.

```
  tabadmin manage_global_credentials --add --server my-server --
```
user jsmith --password p@ssword

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--add</td>
<td>--add</td>
<td></td>
<td>Add credentials for the specified server.</td>
</tr>
<tr>
<td>--remove</td>
<td>--remove</td>
<td></td>
<td>Remove credentials</td>
</tr>
<tr>
<td>--show</td>
<td>--show</td>
<td></td>
<td>Show current credentials</td>
</tr>
<tr>
<td>-s</td>
<td>--server</td>
<td>server</td>
<td>Server for which credentials are being managed</td>
</tr>
<tr>
<td>-u</td>
<td>--username</td>
<td>user</td>
<td>User name for connecting to a server</td>
</tr>
<tr>
<td>-p</td>
<td>--password</td>
<td>password</td>
<td>Password for connecting to a server</td>
</tr>
<tr>
<td>-o</td>
<td>--override</td>
<td></td>
<td>Override existing credentials</td>
</tr>
</tbody>
</table>

See Also

Enabling Delegation for Cloudera Impala in the Tableau Community.

passwd

Resets the password for a Tableau Server account. After typing the command, you are prompted to enter a new password for the user.

You can only use this command if Tableau Server’s user authentication is set to Local Authentication. When authentication is set to Active Directory, passwords are handled by Active Directory, not Tableau Server.
Examples

`tabadmin passwd <username>`

Reset the password for server user **jsmith**:

`tabadmin passwd jsmith`

See Also

Configure General Server Options

`tabadmin recommission <computer name(s) or IPv4 address(es)>`

Recommission file store node by IP address:

`tabadmin recommission 10.32.139.29`

See Also

Distributed Environments

Maintain a Distributed Environment
regenerate_internal_tokens

Creates new security tokens that Tableau Server uses internally. These tokens include the passwords used by Tableau Server to access the repository, and the certificates used to validate internal SSL connections between Tableau Server components and the repository.

Running this command stops Tableau Server, so you will need to restart Tableau Server after you run the command.

Example

tabadmin regenerate_internal_tokens --passwords

tabadmin regenerate_internal_tokens --certs

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--certs</td>
<td>None</td>
<td>None</td>
<td>Regenerates key pair for internal SSL connections.</td>
</tr>
<tr>
<td>--passwords</td>
<td>None</td>
<td>None</td>
<td>Regenerates passwords for the Postgres database.</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Regenerates key pair for internal SSL connections and passwords for Postgres database. <strong>Note:</strong> The key pair is regenerated only if internal SSL is configured.</td>
</tr>
<tr>
<td>--roll_key</td>
<td></td>
<td></td>
<td>Updates the secrets for encrypted passwords that are stored in the repository. See Manage Server Secrets.</td>
</tr>
<tr>
<td>--restart</td>
<td>None</td>
<td>None</td>
<td>Restart Tableau Server after regenerating tokens.</td>
</tr>
</tbody>
</table>

See Also

Regenerate a Password for the Tableau Server PostgreSQL Database (Repository)

Security
register

Register Tableau Server with the user information provided in the specified file. This is used for scripted, automated installations.

**Examples**

tabadmin register --file tabregister.json

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--file</td>
<td>JSON-format file</td>
<td>Register Tableau Server using the information in the specified file.</td>
<td></td>
</tr>
</tbody>
</table>

**See Also**

Automated Installation or Upgrade of Tableau Server

Registration Input File Options

reindex

Rebuilds the search index for Tableau Server. In rare instances, you may need to rebuild the index if searches on the server return incomplete or incorrect results, or if the Search & Browse process is down for an extended period. You can use this command if users cannot sign in to the server because no sites are listed after they enter their credentials.

**Note:** The recommended way to reindex Search is to run this command while Tableau Server is stopped. Reindexing while the server is running can result in content, including sites and projects, temporarily disappearing.

**Examples**
tabadmin reindex

Reindex the server

See Also

Rebuild the Search Index

reset

Resets the Tableau Server administrator account. This command will reset the server so that you will need to set up an administrator account.

Example

tabadmin reset

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--destroy-sessions</td>
<td>None</td>
<td>Destroys all existing sessions. All users will be forced to sign in again.</td>
</tr>
<tr>
<td></td>
<td>--silent</td>
<td>None</td>
<td>Suppresses normal verbose mode. This is useful if you are creating a chain of several automated steps.</td>
</tr>
</tbody>
</table>

See Also

Add an Administrator Account
reset_openid_sub

Clears the user identifier (sub value) that binds a user identity in Tableau Server to a specific OpenID Connect identity provider (IdP).

If Tableau Server is configured to use OpenID Connect for authentication, the first time a user signs in to Tableau Server using the IdP, Tableau stores the sub value sent by the IdP with the user information in Tableau Server. The sub provides a unique identity for that user with the IdP. If you change IdPs for OpenID Connect, you must remove the sub value for the user. That way, when the user signs in using the new IdP, Tableau can store a new sub value.

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--user-name</td>
<td>username</td>
<td></td>
<td>Removes the sub value for the specified user.</td>
</tr>
<tr>
<td>--all</td>
<td>None</td>
<td></td>
<td>Removes the sub value for all users.</td>
</tr>
</tbody>
</table>

**Example**

tabadmin reset_openid_sub --username Alice

This command clears the sub value for the user named Alice.

tabadmin reset_openid_sub --all

This command clears the sub value for all users on the server.

**See Also**

OpenID Connect

Changing IdPs in Tableau Server for OpenID Connect
**restart**

Stops and starts all Tableau Server processes. The restart command also does a configuration so you do not need to do a `tabadmin config` if you are doing a restart (a config will not do any harm).

**Example**

```
tabadmin restart
```

**restore**

Restores a Tableau Server backup file (.tsbak) to a Tableau Server installation. When you restore a .tsbak file, the contents of the Tableau PostgreSQL database, data extracts, and configuration files are overwritten with the content in the backup file. If the backup was made after **web data connectors** were imported to the server using the `import_web-dataconnector` command, the restore process restores the connectors as well. Using the `--no-config` option restores everything but the server’s configuration.

**Examples**

Restore a file named `tabserv.tsbak` located in `C:\mybackups` and then restart the server:

```
tabadmin restore C:\mybackups\tabserv.tsbak --restart
```

Restore a file named `tabserv.tsbak` located in the Tableau Server bin directory and then restart the server:

```
tabadmin restore tabserv.tsbak --restart
```

Restore a file named `tabserv.tsbak` located in `C:\mybackups`, retaining everything but the server’s configuration, but don’t restart the server:

```
tabadmin restore --no-config C:\mybackups\tabserv.tsbak
```
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--no-config</td>
<td>Restore the Tableau Server backup file including the data but excluding the server's configuration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--par-allel-pg-restore</td>
<td>Run the restore process for the PostgreSQL repository as a parallel job.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--password</td>
<td>&lt;password&gt;</td>
<td>Restore the Tableau Server backup file using the Run As User password.</td>
<td></td>
</tr>
<tr>
<td>--password-file</td>
<td>File</td>
<td>Restore the Tableau Server backup file, reading the password from the specified file.</td>
<td></td>
</tr>
<tr>
<td>--restart</td>
<td>Restart the service when the restore process has completed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Also

Restore from a Backup

Recover Extracts from a Backup

set

Allows you to change the value of Tableau Server configuration options.

In some cases, a set command can take multiple values. If so, the values are separated by commas and spaces.

After changing configuration values, you need to run a `tabadmin config` command to update configuration files on all Tableau Server nodes.
Examples

tabadmin set [option-name] [value]

tabadmin set --stdin [option-name] [value]

If the parameter you're setting begins with a hyphen, enclose the parameter's value in both double- and single-quotes.

tabadmin set [option-name] "'[value]'"

Set the backgrounder query limit to 2.5 hours (9000 seconds):

tabadmin set backgrounder.querylimit 9000

Disable sorting, based on duration of last run, of extract refresh jobs:

tabadmin set backgrounder.sort_jobs_by_run_time_history_observable_hours "'-1'"

Set the names of two web servers that request trusted tickets from Tableau Server.

tabadmin set wgserver.trusted_hosts myserver1, myserver2

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-d</td>
<td>-- default</td>
<td></td>
<td>Reset the parameter to its default value.</td>
</tr>
<tr>
<td>-s</td>
<td>--stdin</td>
<td></td>
<td>Read a parameter value from the standard input stream (STDIN) such as the console. You are prompted for the value.</td>
</tr>
</tbody>
</table>

See Also

tabadmin set options
sitestate

Activates (unlocks) or suspends a site. You can use this command to activate a site that was locked because of a site import failure. When a site is suspended, the only Tableau Server user who can access it is the system administrator.

**Note:** To specify the default site, use "" for the site ID.

**Examples**

`tabadmin sitestate <site ID> --status <active|suspended>`

Activate a site whose site ID is `wsales`:

`tabadmin sitestate wsales --status active`

Activate the Default site. The site ID for the Default site is "" (double quotes, no space).

`tabadmin sitestate "" --status active`

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>--status</code></td>
<td><code>active</code></td>
<td>Specifies whether to activate or suspend the specified site.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>or suspended</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**start**

Starts all Tableau Server processes. The start command also does a configuration so you do not need to do a `tabadmin config` if you are doing a start (a config will not do any harm).

**To use** `tabadmin start`:

1. Open a command prompt as an administrator:

   ![Command Prompt]

2. Type the following:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

3. Type the following to start the server:

   ```
   tabadmin start
   ```

**Examples**

```
tabadmin start

tabadmin start --wait 1200
```
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--wait</td>
<td>--wait</td>
<td>number of seconds</td>
<td>Number of seconds after starting after which Tableau Server is ready to accept client requests. The default is 600 seconds.</td>
</tr>
</tbody>
</table>

**status**

Tells you whether or not Tableau Server is running and, if you use the `--verbose` option, gives you details on individual server process status, including whether a process is running and its process ID. The `tabadmin status` command obtains its information by connecting to the Windows Service `tabsvc.exe`, which in turn queries the `tabspawn` executables for each process. Because of this, it can sometimes display different information for the server processes than the status table on the Maintenance page, which queries the processes directly.

**Examples**

```
tabadmin status
```

```
tabadmin status --verbose
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-v</td>
<td>--verbose</td>
<td></td>
<td>Returns a list of all the Tableau Server processes, their process IDs, and their status.</td>
</tr>
</tbody>
</table>

See Also

Server Settings (General)

Tableau Server Processes
Stops all Tableau Server processes. To use `tabadmin stop`:

1. Open a command prompt as an administrator:

   ![Command Prompt](image)

   2. Type the following:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

   3. Type the following to stop the server:

   `tabadmin stop`
validate

Confirms whether your Tableau Server environment meets the minimum requirements for running Tableau Server.

Example

tabadmin validate

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--skiptemp-pIPv6</td>
<td></td>
<td>Skip validating that temporary IPv6 addresses are disabled.</td>
</tr>
</tbody>
</table>

verify_database

Verifies that a backup of the PostgreSQL database that serves as the Tableau Server repository will restore successfully.

**Note:** The `verify_database` command is available beginning with Tableau Server version 9.3.

If you specify a backup file (.tsbak) as an option, the command restores the file to a temporary database in order to verify the backup. If you do not specify a backup file, a temporary backup of the running database is created and then restored to a temporary database. If verification fails, errors are displayed on the command line and are also logged in the `tabadmin.log` file. Until the errors are addressed, You cannot restore a .tsback file that fails verification. If verification of the database fails, contact Tableau Support for assistance.
**Note:** A running PostgreSQL database can have errors that don’t impact use but would cause a failure when you tried to restore a backup. This means that you may be able to continue to use a running database, but you cannot back it up and restore the backup. As a best practice, verify your database before taking a backup (prior to an upgrade, for example).

**Example**

Verify a backup file in the C:\backups\tableau folder named `tabserv.tsbak`:

```
tabadmin verify_database --file C:\backups\tableau\tabserv.tsbak
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>--file</td>
<td>FILE</td>
<td>Backup file to verify. If no file is specified, the command verifies the running PostgreSQL database by making a temporary backup of it.</td>
</tr>
<tr>
<td>-t</td>
<td>--temp</td>
<td>PATH</td>
<td>Location of the temporary folder to use while doing verification. The default is the Tableau temp folder. Temporary files are removed after verification completes.</td>
</tr>
</tbody>
</table>

**See Also**

backup

Verify the Tableau Postgres Database
warmup

Causes every VizQL server process to load the vizql DLL file, resulting in faster load times when server users first load views. Administrators can run this command, or script it to be run, after a Tableau Server restart.

Example

tabadmin warmup

whitelist_webdataconnector

Adds a web data connector to the safe list (whitelist) for an installation of Tableau Server. Users who create workbooks can then reference the web data connector as a data source. Tableau Server only uses the safe list if the `tabadmin web-dataconnector.whitelist.mode` property is set to fixed or mixed.

The safe list includes the URLs of hosted web data connectors that you have vetted and that you want to allow Tableau Server users to connect to. For more information, see Web Data Connectors in Tableau Server.

**Important:** Before you add a web data connector to the safe list, check the functionality of the connector. For more information, see Testing and Vetting Web Data Connectors.

The URLs for connectors in the safe list are case sensitive. When a connector is on the safe list, data sources and workbooks that are associated with the connector can be refreshed on Tableau Server. After you make changes to the safe list, you must restart Tableau Server for the changes to take effect.

For each connector that you add to the safe list, you must also create a secondary safe list specific to that connector. This secondary safe list determines which domains the connector can send requests to and receive requests from. This helps ensure that connectors do not send information to untrusted domains.
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a</td>
<td>--add</td>
<td>Connector URL</td>
<td>Add the URL of a hosted web data connector to the safe list.</td>
</tr>
<tr>
<td>-d</td>
<td>--delete</td>
<td>Connector URL</td>
<td>Remove the URL of a web data connector from the safe list.</td>
</tr>
<tr>
<td>-l</td>
<td>--list</td>
<td></td>
<td>List all of the connector URLs on the safe list.</td>
</tr>
<tr>
<td>-r</td>
<td>--reset</td>
<td></td>
<td>Clear the safe list.</td>
</tr>
<tr>
<td>-s</td>
<td>--add_secondary_whitelist</td>
<td>Connector URL and comma separated list of URLs the connector can make requests to</td>
<td>Add a list of domains that a particular connector can make requests to. The first argument is a connector that has already been added to the safe list. The second argument is a comma separated list of domains or resources. You can include regular expressions in the list of domains. If you do not specify a secondary safe list for a connector, then that connector cannot connect to any domains.</td>
</tr>
<tr>
<td>-p</td>
<td>--print_secondary_whitelist</td>
<td>Connector URL</td>
<td>Print the secondary safe list for a given connector URL.</td>
</tr>
<tr>
<td>-w</td>
<td>--reset_secondary_whitelist</td>
<td>Connector URL</td>
<td>Clear the secondary safe list for a given connector URL.</td>
</tr>
</tbody>
</table>

**Note:** If you use Windows PowerShell to run these commands, you might need to include quotes around the argument. For example, when you add a secondary safe list with regular expressions, you need to include quotes.
Examples

```
tabadmin whitelist_webdataconnector -a https://example.com/myconnector.html
```

```
tabadmin whitelist_webdataconnector -a http://example.com:8080/myconnector.html
```

```
tabadmin whitelist_webdataconnector -d https://example.com/myconnector.html
```

```
```

```
tabadmin whitelist_webdataconnector -p https://example.com/myconnector.html
```

```
tabadmin whitelist_webdataconnector -w https://example.com/myconnector.html
```

See Also

Web Data Connectors in Tableau Server

Tableau webdataconnector page on GitHub

ziplogs

Creates an archive (.zip) containing Tableau Server log files, without removing the log files themselves. If you are running a Tableau Server cluster, log files from worker servers are included in the archive that's created. You can specify the file name and location. If you don’t provide a file name, the archive is called logs.zip. If you don’t include a path, the file is saved in the bin directory. Saving an archive file to a UNC path is not supported.

Examples

Create an archive in the Tableau Server bin directory named logs.zip:

```
tabadmin ziplogs
```
Create an archive in the Tableau Server bin directory named `mylogs.zip`:

```
tabadmin ziplogs mylogs.zip
```

Create an archive in the Tableau Server bin directory named `mylogs.zip` that includes logs dated January 31, 2014 up to the present, excluding earlier logs:

```
tabadmin ziplogs -d 01/31/2014 mylogs.zip
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>--with-net-stat-info</td>
<td></td>
<td>Include information about the server environment in the .zip file.</td>
</tr>
<tr>
<td>-p</td>
<td>--with-postgresql-data</td>
<td></td>
<td>Include data from Tableau Server’s PostgreSQL database. If Tableau Server is stopped, make a copy of the psql\data folder. If Tableau Server is running, get the data as binary dump files.</td>
</tr>
<tr>
<td>-l</td>
<td>--with-latest-dump</td>
<td></td>
<td>Limit the included log files to only the most recent ones to help reduce file size. By default, the 10 most recent log files are included.</td>
</tr>
<tr>
<td>-f</td>
<td>--force</td>
<td></td>
<td>Overwrites the existing log file of the same name.</td>
</tr>
<tr>
<td>-d</td>
<td>--min-imumdate</td>
<td>[mm/dd/yyyy]</td>
<td>Log files with this date, up to the present, are included in the .zip file. Logs dated earlier are excluded from the file. If not specified, up to seven days worth of data is included.</td>
</tr>
<tr>
<td>-a</td>
<td>--all</td>
<td></td>
<td>Include all log files in the .zip file. Data from Tableau Server’s PostgreSQL database is still excluded.</td>
</tr>
</tbody>
</table>
See Also

Work with Log Files

Archive Logs on Command Line (tabadmin)

**tabadmin set options**

Use the table below to learn more about Tableau Server options you can configure using the set command. See Tableau Server Ports for a complete list of ports.

After using `tabadmin set` to change configuration options, you need to run a `tabadmin config` command to update configuration files on all Tableau Server nodes.

<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>api.server.enabled</td>
<td>true</td>
<td>Allows access to the Tableau Server REST API. By default, this functionality is enabled.</td>
</tr>
<tr>
<td>auditing.enabled</td>
<td>true</td>
<td>Allows access to the PostgreSQL (Tableau Server’s own database) historical auditing tables. See Collect Data with the Tableau Server Repository for details.</td>
</tr>
<tr>
<td>backgrounder.extra_timeout_in_seconds</td>
<td>1800</td>
<td>The number of seconds beyond the setting in <code>backgrounder.querylimit</code> before a background task is canceled. This setting makes sure that tasks do not hold up subsequent jobs if they are stalled. The setting applies to processes listed in <code>backgrounder.timeout_tasks</code>.</td>
</tr>
<tr>
<td>backgrounder.failure_threshold_for_run_prevention</td>
<td>5</td>
<td>The number of consecutive failures of a subscription or extract job before that job is suspended. Suspending continuously failing jobs helps preserve backgrounder resources for other jobs. To disable sus-</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>pension of failing background tasks, set this to -1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>backgrounder.querylimit</strong></td>
<td>7200</td>
<td>Longest allowable time, in seconds, for completing a single extract refresh task or subscription task. 7200 seconds = 2 hours.</td>
</tr>
<tr>
<td><strong>Note:</strong> If a background task reaches this time limit, it may continue to run for an additional several minutes while being canceled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>backgrounder.reset_schedules_on_startup</strong></td>
<td>true</td>
<td>Controls when to run background tasks that were scheduled to run at a time when the server was stopped. When set to true (the default), tasks are run at their next scheduled time. When set to false, all tasks that were scheduled to run when the server was stopped are run, simultaneously, at server startup, including times when the Tableau Server backup file (.tsbak) is restored.</td>
</tr>
<tr>
<td><strong>backgrounder.send_email_on_refresh_failure</strong></td>
<td>true</td>
<td>Controls whether extract refresh alerts are enabled for all sites on the server. By default alerts are enabled. To disable extract refresh alerts for all sites on a server, set this to false.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extract alerts can be enabled or disabled on a site basis by site administrators in site settings, or at the user level in user settings.</td>
</tr>
<tr>
<td>backgrounder.sort_jobs_by_run_time_history_observable_hours</td>
<td>-1</td>
<td>Controls the time window used when determining duration of the last full extract job.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tableau Server can sort full extract refresh jobs so they are executed based on the duration of their &quot;last run,&quot; executing the fastest full extract refresh jobs first.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The &quot;last run&quot; duration of a particular job is determined from a random sample of a single instance of the full extract refresh job in last &lt;n&gt; hours. Full extract jobs are then prioritized to run in order from shortest to longest based on their &quot;last&quot; run duration. By default this is sorting is disabled (-1). If enabling this, the suggested value is 36 (hours).</td>
</tr>
<tr>
<td>backgrounder.sort_jobs_by_type_schedule_boundary_heuristicsmilliseconds</td>
<td>60000</td>
<td>Controls the time window that identifies backgrounder jobs which are determined to have the same scheduled start time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The backgrounder process orders work that is scheduled at the same time to be executed by job type, running the fastest category of jobs first: Subscriptions, then Incremental Extracts, then Full Extracts.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jobs are batched to determine which jobs are scheduled at the “same time”. A value 60,000 milliseconds (the default) indicates jobs for schedules starting within a 1 minute window should be classified in the same batch and so are ordered by type within that batch.</td>
</tr>
<tr>
<td>backgrounder.subscription_image_caching</td>
<td>true</td>
<td>Controls whether backgrounder will cache images that are generated for subscriptions. Cached images do not have to be regenerated each time so caching improves subscription performance. By default image caching is enabled. To disable image caching for all sites on a server, set this to false.</td>
</tr>
<tr>
<td>backgrounder.timeout_tasks</td>
<td>refresh_extractss, increment_extractss, subscription_notify, single_subscription</td>
<td>The list of tasks that can be canceled if they run longer than the combined values in <code>backgrounder.querylimit</code> and <code>backgrounder.extra_timeout_in_seconds</code>. The list of tasks is delimited with commas. The default list represents all the possible values for this setting.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>option_notify</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>cluster-controller.pgsql.failover</code></td>
<td><code>true</code></td>
<td>In a high availability environment, controls whether failover of the PostGRES repository occurs automatically (the default). When set to <code>false</code>, failover to the passive repository only occurs when you run the <code>fail-overrepository</code> command.</td>
</tr>
<tr>
<td><code>clustercontroller.zk_session_timeout_ms</code></td>
<td><code>300000</code></td>
<td>The length of time, in milliseconds, that Cluster Controller will wait for the Coordination Service (ZooKeeper), before determining that failover is required.</td>
</tr>
<tr>
<td><code>dataengine.port</code></td>
<td><code>27042</code></td>
<td>Port that the data engine runs on.</td>
</tr>
<tr>
<td><code>dataserver.port</code></td>
<td><code>9700</code></td>
<td>Port that the data server runs on.</td>
</tr>
<tr>
<td>DataServer-RefreshMetadataPer-Session</td>
<td><code>false</code></td>
<td>Determines whether Tableau Server will make additional queries to get updated schema data for a published data source when there have been changes in the underlying schema structure. This is disabled by default for performance reasons, and there is a delay in the display of schema changes. If you want changes in the schema of a live published data source to be reflected quickly, or if you see errors (for example, &quot;An error occurred while communicating with the data source: Invalid column name. Statement could not be prepared.&quot;) set this to <code>true</code>. When set to <code>true</code>, Tableau Server makes additional queries to update the</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>features.DesktopReporting</td>
<td>false</td>
<td>Controls whether Desktop License Reporting is enabled on the server. When set to false (the default), no Administrative Views related to desktop licenses are available. Set this to true to enable license reporting and make license usage and expiration Administrative Views visible on the Server Status page.</td>
</tr>
<tr>
<td>gateway.http.hsts</td>
<td>false</td>
<td>The HTTP Strict Transport Security (HSTS) header forces browsers to use HTTPS on the domain where it is enabled.</td>
</tr>
<tr>
<td>gateway.http.hsts_options</td>
<td>&quot;max-age=31536000&quot;</td>
<td>By default, HSTS policy is set for one year (31536000 seconds). This time period specifies the amount of time in which the browser will access the server over HTTPS.</td>
</tr>
<tr>
<td>gateway.http.request_size_limit</td>
<td>16380</td>
<td>The maximum size (bytes) of header content that is allowed to pass through the Apache gateway on HTTP requests. Headers that exceed the value set on this option will result in browser errors, such as HTTP Error 413 (Request Entity Too Large) or authentication failures. A low value for gateway.http.request_size_limit may result in authentication errors. Single sign-on solutions that integrate with Active Directory (SAML and Kerberos) often require large authentication tokens in HTTP headers. Be</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sure to test HTTP authentication scenarios before deploying into production. We recommend setting <code>tomcat.http.maxrequestsize</code> option to the same value that you set for this option.</td>
</tr>
<tr>
<td>gateway.http.x_content_type_nosniff</td>
<td>true</td>
<td>The X-Content-Type-Options response HTTP header specifies that the MIME type in the Content-Type header should not be changed by the browser. In some cases, where MIME type is not specified, a browser may attempt to determine the MIME type by evaluating the characteristics of the payload. The browser will then display the content accordingly. This process is referred to as &quot;sniffing.&quot; Misinterpreting the MIME type can lead to security vulnerabilities. The X-Content-Type-Options HTTP header is set to 'nosniff' by default with this option.</td>
</tr>
<tr>
<td>gateway.http.x_xss_protection</td>
<td>true</td>
<td>The HTTP X-XSS-Protection response header is sent to the browser to enable cross-site scripting (XSS) protection. The X-XSS-Protection response header overrides configurations in cases where users have disabled XSS protection in the browser. The X-XSS-Protection response header is enabled by default with this option.</td>
</tr>
<tr>
<td>gateway.public.host</td>
<td>Name of the machine</td>
<td>The name (URL) of the server, used for external access to Tableau Server. If Tableau Server is configured to work with a</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>proxy server or external load balancer, it is the name entered in a browser address bar to reach Tableau Server. For example, if Tableau Server is reached by entering <code>tableau.example.com</code>, the name for <code>gateway.public.host</code> is <code>tableau-.example.com</code>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gateway.public.port</td>
<td>80 (443 if SSL)</td>
<td>Applies to proxy server environments only. The external port the proxy server listens on.</td>
</tr>
<tr>
<td>gateway.slow_post_protection.enabled</td>
<td>false</td>
<td>Enabling this can provide some help in protecting against slow POST (Denial-of-Service) attacks by timing out POST requests that transfer data at extremely slow rates. <strong>Note:</strong> This will not eliminate the threat of such attacks, and could have the unintended impact of terminating slow connections.</td>
</tr>
<tr>
<td>gateway.timeout</td>
<td>1800</td>
<td>Longest amount of time, in seconds, that the gateway will wait for certain events before failing a request (1800 seconds = 30 minutes).</td>
</tr>
<tr>
<td>gateway.trusted</td>
<td>IP address of proxy server machine</td>
<td>Applies to proxy server environments only. The IP address(es) or host name(s) of the proxy server.</td>
</tr>
<tr>
<td>gateway.trusted_hosts</td>
<td>Alternate names of proxy server</td>
<td>Applies to proxy server environments only. Any alternate host name(s) for the proxy server.</td>
</tr>
<tr>
<td>install.fire</td>
<td>true</td>
<td>Controls whether Tableau Server can add</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>wall.allowedprograms.manage</td>
<td></td>
<td>firewall rules. When set to true (the default), Tableau Server will add new firewall rules to allow its processes to make connections through Windows Firewall. Change this to false if you want to manage all firewall rules yourself and do not want Tableau Server to add new rules.</td>
</tr>
<tr>
<td>java.heap.size</td>
<td>128m</td>
<td>Size of heap for Tomcat (repository and solr). This generally does not need to change except on advice from Tableau.</td>
</tr>
<tr>
<td>monitoring.dataengine.connection_timeout</td>
<td>30000</td>
<td>The length of time, in milliseconds, that Cluster Controller will wait for the data engine, before determining that a connection timeout occurred. The default is 30,000 milliseconds (30 seconds).</td>
</tr>
<tr>
<td>native_api.-connection.limit.&lt;connection class&gt;</td>
<td></td>
<td>Set parallel query limit for the specified data source (connection class). This overrides the global limit for the data source.</td>
</tr>
<tr>
<td>native_api.-connection.globallimit</td>
<td>16</td>
<td>Global limit for parallel queries. Default is 16 except for Amazon Redshift which has a default of 8.</td>
</tr>
<tr>
<td>native_api.ProtocolTransitionLegacyFormat</td>
<td>false</td>
<td>Use the legacy name format for constrained delegation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The name format was changed in version 10.1 to allow cross-domain protocol transition (S4U). If this causes problems with existing configurations and you don't need cross-</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>domain protocol transition, configure Tableau Server to use the old behavior by setting this to true.</strong></td>
</tr>
<tr>
<td>features.PasswordReset</td>
<td>false</td>
<td>Applies only to servers that use local authentication. Set to true to let users reset their passwords with a &quot;Forgot password&quot; option on the sign-in page.</td>
</tr>
<tr>
<td>pgsql.port</td>
<td>8060</td>
<td>Port that PostgreSQL listens on.</td>
</tr>
<tr>
<td>pgsql.verify_restore.port</td>
<td>8061</td>
<td>Port used to verify the integrity of the PostgreSQL database. See Verify the Tableau Postgres Database for more information.</td>
</tr>
<tr>
<td>rsync.timeout</td>
<td>600</td>
<td>Longest allowable time, in seconds, for completing file synchronization (600 seconds = 10 minutes). File synchronization occurs as part of configuring high availability, or moving the data engine and repository processes.</td>
</tr>
<tr>
<td>schedules.display_schedule_description_as_name</td>
<td>false</td>
<td>Controls whether a schedule name displays when creating a subscription or extract refresh (the default), or the &quot;schedule frequency description&quot; name describing the time and frequency of the schedule displays. To configure Tableau Server to display timezone-sensitive names for schedules, set this value to true.  When true, the &quot;schedule frequency description&quot; is also displayed after the schedule</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>schedules.display_schedules_in_client_timezone</td>
<td>true</td>
<td>Shows the &quot;schedule frequency description&quot; in the timezone of the user when true (uses the client browser timezone to calculate the &quot;schedule frequency description&quot;).</td>
</tr>
<tr>
<td>server.log.level</td>
<td>info</td>
<td>The logging level for logs written to ProgramData\Tableau\Tableau Server-data\tabsvc\logs\vizqlserver\Logs*.txt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set to debug for more information. When set to debug, logging is set to pre-8.2 verbosity. Using the debug setting can significantly impact performance, so you should only use it when directed to do so by Tableau Support. See Change Logging Levels for more information.</td>
</tr>
<tr>
<td>service.init.state</td>
<td>start</td>
<td>Determines whether or not Tableau Server will automatically start when operating system of the computer Tableau Server is running on is restarted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valid options are start and pause.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set this to pause if Tableau Server should not start on a restart of the computer.</td>
</tr>
<tr>
<td>service.jmx_enabled</td>
<td>false</td>
<td>Setting to true enables JMX ports for optional monitoring and troubleshooting. See Enable the JMX Ports for details.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>service.max_procs</td>
<td># of processes</td>
<td>Maximum number of server processes.</td>
</tr>
<tr>
<td>service.port_remap-</td>
<td>true</td>
<td>Determines whether or not Tableau Server will attempt to dynamically remap</td>
</tr>
<tr>
<td>port_remap.-ping.enabled</td>
<td></td>
<td>ports when the default or configured ports are unavailable. Setting to \texttt{false} disables dynamic port remapping. See Tableau Server Ports for more information.</td>
</tr>
<tr>
<td>session.ipsticky</td>
<td>false</td>
<td>Makes client sessions valid only for the IP address that was used to sign in. If a request is made from an IP address different from that associated with the session token, the session token is considered invalid. In certain circumstances—for example, when Tableau Server is being accessed by computers with known and static IP addresses—this setting can yield improved security.</td>
</tr>
</tbody>
</table>

\textbf{Note}: Consider carefully whether this setting will help your server security. This setting requires that the client have a unique IP address and an IP address that stays the same for the duration of the session. For example, different users who are behind a proxy might look like they have the same IP address.
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(namely, the IP address of the proxy); in that case, one user might have access to another user's session. In other circumstances, users might have a dynamic IP address, and their address might change during the course of the session. If so, the user has to sign in again.</td>
</tr>
<tr>
<td>sheet_image.enabled</td>
<td>true</td>
<td>Controls whether you can get images for views with the REST API. For more information, see the REST API Reference in the REST API help.</td>
</tr>
<tr>
<td>solr.rebuild_index_timeout</td>
<td>3600</td>
<td>When Tableau Server is upgraded or when a .tsbak file is restored, the background task rebuilds the search index. This setting controls the timeout setting for that task (3600 seconds = 60 minutes).</td>
</tr>
<tr>
<td>ssl.client_certificate_login._fallback_to_password</td>
<td>false</td>
<td>Specifies if Tableau Server should use user name and password for authentication if SSL authentication fails. Valid options are false (the default) and true. By default, when configured for mutual SSL, Tableau Server does not allow a connection if SSL authentication fails. Set this to true</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ssl.client_certificate_login.mapping_strategy</td>
<td>UPN or LDAP</td>
<td>Specifies the method to be used for retrieving the user name from the certificate. Options are LDAP, UPN, or CN. The default depends on how Tableau Server is configured for user authentication:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When Tableau Server authentication is configured for Local Authentication, the default is UPN (User Principal Name).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- When Tableau Server authentication is configured for Active Directory (AD), the default is LDAP (Lightweight Directory Access Protocol).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CN (Common Name) is an option the administrator can set for either authentication type.</td>
</tr>
<tr>
<td>ssl.revocation.file</td>
<td></td>
<td>Specifies the file path for an SSL CA Certificate Revocation List (CRL) file.</td>
</tr>
<tr>
<td>subscriptions.enabled</td>
<td>false</td>
<td>Controls whether subscriptions are configurable system-wide. See Set Up Subscriptions.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>subscriptions.timeout</td>
<td>1800</td>
<td>Longest allowable time, in seconds, for a single view in a workbook subscription task to be rendered before the task times out. This value applies separately to each view in the workbook, so the total length of time to render all the views in a workbook (the full subscription task) may exceed this timeout value. 1800 seconds = 30 minutes.</td>
</tr>
</tbody>
</table>
| tomcat.http.maxrequests | 16380         | The maximum size (bytes) of header content that is allowed to pass through the Apache gateway on HTTP requests. Headers that exceed the value set on this option will result in browser errors, such as HTTP Error 413 (Request Entity Too Large) or authentication failures.  
A low value for `tomcat.http.maxrequests` may result in authentication errors. Single sign-on solutions that integrate with Active Directory (SAML and Kerberos) often require large authentication tokens in HTTP headers. Be sure to test HTTP authentication scenarios before deploying into production.  
We recommend setting `gateway.http.request_size_limit` option to the same value that you set for this option. |
<p>| tomcat.https.port      | 8443          | SSL port for Tomcat (unused).                                                                                                                                                                                 |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tomcat.server.port</td>
<td>8085</td>
<td>Port that tomcat listens on for shutdown messages.</td>
</tr>
<tr>
<td>vizportal.adsync.update_system_user</td>
<td>false</td>
<td>Specifies whether email addresses and display names of users are changed (even when changed in Active Directory) when an Active Directory group is synchronized in Tableau Server. To ensure that user email addresses and display names are updated during synchronization, set vizportal.adsync.update_system_user to true, and then restart the server.</td>
</tr>
<tr>
<td>vizportal.csv_user_mgmt.index_site_users</td>
<td>true</td>
<td>Specifies whether indexing of site users is done user by user when importing or deleting users with a CSV file. When set to true (the default) indexing is done as each user is added or deleted. To delay the indexing of the site users until after the entire CSV file has been processed, set this to false.</td>
</tr>
</tbody>
</table>
| vizportal.log.level          | info          | The logging level for vizportal Java components. Logs are written to ProgramData\Tableau\Tableau Server-data\absvc\logs\vizportal\*.log. Set to debug for more information. Using the debug setting can significantly impact performance, so you should only use this setting when directed to do so by Tableau Support. See Change Logging Levels for more inform-


<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vizportal.openid.client_authentication</td>
<td></td>
<td>Specifies custom client authentication method for OpenID Connect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To configure Tableau Server to use the Salesforce IdP, set this value to <code>client_secret_post</code>.</td>
</tr>
<tr>
<td>vizportal.openid.id_claim</td>
<td>sub</td>
<td>Change this value if your IdP does not use the <code>sub</code> claim to uniquely identify users in the ID token. The IdP claim that you specify should contain a single, unique string. For more information, see Requirements for Using OpenID Connect.</td>
</tr>
<tr>
<td>vizportal.openid.ignore_jwk</td>
<td>false</td>
<td>Set this to <code>true</code> if your IdP does not support JWK validation. In this case, we recommend authenticating communication with your IdP using mutual TLS or another network layer secure protocol.</td>
</tr>
<tr>
<td>vizportal.openid.ignore_domain</td>
<td>false</td>
<td>Set this to <code>true</code> if the following are true:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* You are using email addresses as usernames in Tableau Server</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* You have provisioned users in the IdP with multiple domain names</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* You want to ignore the domain name portion of the <code>email</code> claim from the IdP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Before you proceed, review the user names that will be used as a result of setting <code>viz-</code></td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>portal.openid.ignore_domain</td>
<td>true</td>
<td>\textit{User name conflicts may occur. In the case of a user name conflict, the risk of information disclosure is high. See Requirements for Using OpenID Connect.}</td>
</tr>
<tr>
<td>vizportal.openid.static_file</td>
<td>file path</td>
<td>Specifies the local path to the static OIDC discovery JSON document. See Configure Tableau Server for OpenID Connect.</td>
</tr>
<tr>
<td>vizportal.openid.username_claim</td>
<td>email</td>
<td>Change this value to the IdP claim that your organization will use to match usernames as stored in Tableau Server. For more information, see Requirements for Using OpenID Connect.</td>
</tr>
</tbody>
</table>
| vizportal.rest_api.-cors.allow_origin | | Specifies the origins (sites) that are allowed access to the REST API endpoints on Tableau Server when \texttt{vizportal.rest_api.cors.enabled} is set to true. You can specify more than one origin by separating each entry with a comma (,).

\begin{verbatim}
tabadmin set vizportal.rest_api.cors.allow_origin
\end{verbatim}

If \texttt{vizportal.rest_api.-cors.enabled} is false, the origins listed by this option are ignored. For more inform-
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vizportal.rest_api.-cors.enabled</td>
<td>false</td>
<td>Controls whether Tableau Server allows Cross Origin Resource Sharing (CORS). When set to true, the server allows web browsers to access the Tableau REST API endpoints. You can use this option and the REST API to create custom portals. By default, this functionality is not enabled. To specify which origins (sites) have access, use the vizportal.rest_api.-cors.allow_origin option. Only the origins specified with this option are allowed to make requests to the Tableau Server REST API. For more information, see Enabling CORS on Tableau Server.</td>
</tr>
<tr>
<td>vizportal.rest_api.view_image.max_age</td>
<td>720</td>
<td>The amount of time, in minutes, to cache images that are generated by the Query View Image method of the REST API. For</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>more information, see the REST API Reference in the REST API help.</td>
<td></td>
</tr>
<tr>
<td>vizqlserver.allow_insecure_scripts</td>
<td>false</td>
<td>Allows a workbook to be published to the server from Tableau Desktop, and to be opened from the server, even if the workbook contains SQL or R expressions that are potentially unsafe (for example, a SQL expression that could potentially allow SQL injection). When this setting is false (the default), publishing a workbook or opening it from the server results in an error message, and the workbook is blocked. You should set this value to true only if you want to use workbooks that contain SQL or R expressions that have been detected as potentially unsafe, and only if the workbooks come from a safe source and you have verified that they do not contain an unsafe expression.</td>
</tr>
<tr>
<td>vizqlserver.browser.render</td>
<td>true</td>
<td>Views under the threshold set by vizqlserver.browser.render_threshold or vizqlserver.browser.render_threshold_mobile are rendered by the client web browser instead of by the server. See About Client-Side Rendering for details.</td>
</tr>
<tr>
<td>vizqlserver.browser.render_threshold</td>
<td>100</td>
<td>The default value (100) represents a high level of complexity for a view displayed on a PC. Complexity factors include number of marks, headers, reference lines, and annotations. Views that exceed this level of complex-</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complexity are rendered by the server instead of in the PC’s web browser.</td>
</tr>
<tr>
<td><code>vizqlserver.browser.render_threshold_mobile</code></td>
<td>60</td>
<td>The default value (60) represents a high level of complexity for a view displayed on a tablet. Complexity factors include number of marks, headers, reference lines, and annotations. Views that exceed this level of complexity are rendered by the server instead of in the tablet’s web browser.</td>
</tr>
<tr>
<td><code>vizqlserver.clear_session_on_unload</code></td>
<td><code>false</code></td>
<td>Determines whether or not VizQL sessions are kept in memory when a user navigates away from a view or closes their browser. The default value (<code>false</code>) keeps sessions in memory. To close VizQL sessions on leaving a view or closing a browser, set this to <code>true</code>. See General Performance Guidelines for more information.</td>
</tr>
<tr>
<td><code>vizqlserver.extsvc.host</code></td>
<td></td>
<td>Specifies an Rserve host.</td>
</tr>
</tbody>
</table>

**Note:** In versions of Tableau before version 10.1, this setting was named `vizqlserver.rserve.host`. Be sure to use this earlier setting name if your Tableau version is older than version 10.1.

This setting, and the three settings immediately below, supports R functionality in workbooks. R is an open source software
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>programming language and a software environment for statistical computing and graphics. In Tableau Desktop, you can use a set of four functions to pass R expressions to an Rserve server and obtain a result. If you upload a workbook that uses any of these functions, you should configure Tableau Server for an Rserve connection, by configuring this option and the three following. Otherwise, any worksheets that use R functionality will be unavailable. See Pass Expressions to External Services in the Tableau Desktop help for further details.</td>
</tr>
<tr>
<td>vizqlserver.extsvc.port</td>
<td>6311</td>
<td>Specifies an Rserve port. This setting supports R functionality in workbooks. Note: In versions of Tableau before version 10.1, this setting was named vizqlserver.rserve.port. Be sure to use this earlier setting name if your Tableau version is older than version 10.1.</td>
</tr>
<tr>
<td>vizqlserver.extsvc.username</td>
<td></td>
<td>Specifies an Rserve username. This setting supports R functionality in workbooks. Not all Rserve hosts require a username and password.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> In versions of Tableau before version 10.1, this setting was named vizqlserver.rserve.username. Be sure to use this earlier setting name if your Tableau version is older than version 10.1.</td>
</tr>
<tr>
<td>vizqlserver.extsvc.password</td>
<td></td>
<td>Specifies an Rserve password. This setting supports R functionality in workbooks. Not all Rserve hosts require a username and password.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> In versions of Tableau before version 10.1, this setting was named vizqlserver.rserve.password. Be sure to use this earlier setting name if your Tableau version is older than version 10.1.</td>
</tr>
<tr>
<td>vizqlserver.geosearch_cache_size</td>
<td>5</td>
<td>Sets the maximum number of different geographic search locale/language data sets that can be loaded into server memory at the same time. When the server receives a geographic search request for locale/language data set that is not in memory, it will load the set into memory. If loading the data set will exceed the specified limit, the least recently used locale/language data set is cleared</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from memory so the requested one can be loaded. The minimum value is 1. Each cache takes approximately 60 MB in memory (so if you set this to 10, the memory usage would be 600 MB (60 * 10).</td>
</tr>
<tr>
<td>vizqlserver.log.level</td>
<td>info</td>
<td>The logging level for vizqlserver Java components. Logs are written to ProgramData\Tableau\Tableau Server-data\t-absvc\logs\vizqlserver*.log. Set to debug for more information. Using the debug setting can significantly impact performance, so you should only use it when directed to do so by Tableau Support. See Change Logging Levels for more information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vizqlserver.port</td>
<td>9100</td>
<td>Base port for the VizQL servers.</td>
</tr>
<tr>
<td>vizqlserver.protect_sessions</td>
<td>true</td>
<td>When set to true (the default), prevents VizQL sessions from being reused after the original user signs out.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vizqlserver.querylimit</td>
<td>1800</td>
<td>Longest allowable time for updating a view, in seconds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vizqlserver.session.expiry.minimum</td>
<td>5</td>
<td>Number of minutes of idle time after which a VizQL session is eligible to be discarded if the VizQL process starts to run out of memory.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>vizqlserver.session.expiry.timeout</td>
<td>30</td>
<td>Number of minutes of idle time after which a VizQL session is discarded.</td>
</tr>
<tr>
<td>vizqlserver.showdownload</td>
<td>true</td>
<td>Controls the display of the Tableau Workbook option of the Download menu in views. When set to false, the Tableau Workbook option is unavailable.</td>
</tr>
<tr>
<td>vizqlserver.showshare</td>
<td>true</td>
<td>Controls the display of Share options in views. To hide these options, set to false.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Note:</strong> Users can override the server default by setting the &quot;showShareOptions&quot; JavaScript or URL parameter.</td>
</tr>
<tr>
<td>vizqlserver.trustedticket.log_level</td>
<td>info</td>
<td>The logging level for trusted authentication. The logs are written to ProgramData\Tableau\Tableau Server\data\tabsvc\logs\vizqlserver\vizql-*.log.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set to debug for more information. Using the debug level can significantly impact performance, so you should only use it when directed to do so by Tableau Support. See Change Logging Levels for more information.</td>
</tr>
<tr>
<td>vizqlserver.trustedticket.token_length</td>
<td>24</td>
<td>Determines the number of characters in each trusted ticket. The default setting of 24 characters provides 144 bits of randomness.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The value can be set to any integer between 9 and 255, inclusive. As of Tableau Server 10.2, this option is ignored unless wgserv-er.trustedticket.use_deprecated_v2_tickets is set to true, which is not a recommended best practice.</td>
</tr>
<tr>
<td>vizqlserver.trustedticket.use_deprecated_9digit_token</td>
<td>false</td>
<td>When set to true, tickets are 9 digits long (as in version 8.0 and earlier) and the setting vizqlserver.trustedticket.token_length is ignored.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Warning:</strong> Setting this option to true severely and negatively impacts the security strength of trusted ticket authentication. For strongest security, upgrade to Tableau Server 10.2 and run trusted tickets in the default configuration.</td>
</tr>
<tr>
<td>vizqlserver.url_scheme_whitelist</td>
<td></td>
<td>Specifies one or more URL schemes to whitelist when using URL actions on views and dashboards. The schemes http, https, gopher, news, ftp, and mailto are whitelisted by default. This command can contain multiple comma and space-separated values, as in this example: tabadmin set vizqlserver.url_scheme_whitelist scheme1,</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>scheme2</strong></td>
<td></td>
<td>The values you specify overwrite previous settings. Therefore, you must include the full list of schemes in the <code>set</code> command. (You cannot amend the list of schemes by running the <code>set</code> command repeatedly.)</td>
</tr>
<tr>
<td>web-dataconnector.enabled</td>
<td>true</td>
<td>When this setting is true, you can use <code>tabadmin</code> commands to manage web data connectors on the server, and web data connectors are included when you back up and restore the server. If the setting is false, web data connectors that are on the server are not included during backup and restore. For more information, see Web Data Connectors in Tableau Server.</td>
</tr>
<tr>
<td>web-dataconnector.refresh.enabled</td>
<td>true</td>
<td>When this setting is true, the server supports doing refreshes for web data connector-based data sources. For more information, see Web Data Connectors in Tableau Server.</td>
</tr>
<tr>
<td>web-dataconnector.whitelist.mode</td>
<td>mixed</td>
<td>Determines how Tableau Server can run web data connectors. Supported modes are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>local</strong>. Users can run connectors that have been imported to Tableau Server.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• <strong>fixed</strong>. Users can run connectors that are on a safe list (whitelist) of URLs.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
|                                             |               | • mixed. Users can run imported connectors or connectors on the safe list.  
|                                             |               | • insecure. Users can run any connector.                                                                                                                                                                    |
|                                             |               | **Important:** Use the `insecure` option only for development and testing.  
<p>|                                             |               | Because connectors run custom code, running connectors that have not been vetted can pose a security threat.                                                                                              |
|                                             |               | For more information about how to add connectors to a safe list and import connectors, see Web Data Connectors in Tableau Server.                                                                 |
| wgserver.audit_history_expiration_days     | 183           | Specifies the number of days after which historical events records are removed from the PostgreSQL database (the Tableau Server database). See Collect Data with the Tableau Server Repository for details. |
| wgserver.authentication.desktop_nosaml     | false         | Controls whether or not Tableau Desktop uses SAML for authentication. Use this option when your IdP does not use forms-based authentication. Valid options are true and false. By default this is not set, so the behavior is equivalent to setting it to false. Set this to true to disable SAML authentication for Tableau Desktop. |</p>
<table>
<thead>
<tr>
<th>Option</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wgserv-er.authentication.app_nosaml</td>
<td>false</td>
<td>Serves as the above setting for the Tableau Mobile app.</td>
</tr>
<tr>
<td>wgserv-er.authentication.restricted</td>
<td>false</td>
<td>Controls whether users can sign in to Tableau Server using a Tableau Server username and password. This setting is useful in scenarios where users normally sign in to the server using single sign-on (OpenID Connect or Kerberos, for example). In these cases, if <code>wgserv-er.authentication.restricted</code> is set to true (the default is false), only system administrators can use <code>tabcmd</code> because this utility doesn't support SSO so requires a username and password.</td>
</tr>
<tr>
<td>wgserver.change_owner.enabled</td>
<td>true</td>
<td>Controls whether the ownership of a workbook, data source or project can be changed. Other options include false and adminonly. See Manage Ownership for details.</td>
</tr>
<tr>
<td>wgserver.clickjack_defense.enabled</td>
<td>true</td>
<td>When set to true, helps prevent a malicious person from &quot;clickjacking&quot; a Tableau Server user. In a clickjack attack, the target page is displayed transparently over a second page, and the attacker gets the user to click or enter information in the target page while the user thinks he or she is interacting with the second page. For more information, see Clickjack Pro-</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>wgserver.domain.fqdn</td>
<td>value of %USERDOMAIN%</td>
<td>The fully qualified domain name of the Active Directory server to use.</td>
</tr>
<tr>
<td>wgserver.extended_trusted_ip_checking</td>
<td>false</td>
<td>Enforces IP client matching for trusted ticket requests.</td>
</tr>
<tr>
<td>wgserver.restrict_options_method</td>
<td>true</td>
<td>Controls whether Tableau Server accepts HTTP OPTIONS requests. If this option is set to true, the server returns HTTP 405 (Method Not Allowed) for HTTP OPTIONS requests.</td>
</tr>
<tr>
<td>wgserver.saml.idpattribute.username</td>
<td>username</td>
<td>Specifies the attribute used by the IdP for SAML authentication. The default is username. For more information, see SAML.</td>
</tr>
<tr>
<td>wgserver.saml.iframed_idp.enabled</td>
<td>true</td>
<td>When enabled, if you are using embedded views and SAML, this suppresses the Tableau Server Sign In button and redirects the user to the IdP for authentication. This only works if the IdP does not implement clickjack protection. If the IdP sign in page implements clickjack protection, the page will not display and the user cannot sign in. Most SAML IdPs implement clickjack protection and do not allow their sign in page to display in an &lt;iframe&gt; element. The default is false.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Important</strong>: Using this option disables Tableau Server clickjack protection for SAML, which can present a security risk.</td>
</tr>
<tr>
<td><code>wgserv-</code></td>
<td><code>true</code></td>
<td>Specifies whether SAML logout is enabled for Tableau Server. The default is <code>true</code>. This setting only applies if SAML authentication is enabled for Tableau Server.</td>
</tr>
<tr>
<td><code>er.saml.logout.enabled</code></td>
<td></td>
<td>Specifies the post-logout landing page for SAML authentication. The default is the standard server sign-in page. You can specify an absolute or a relative URL. For more information, see <a href="#">SAML Requirements</a>.</td>
</tr>
<tr>
<td><code>wgserv-</code></td>
<td><code>3000</code></td>
<td>Specifies the maximum number of seconds, from creation, that an assertion is usable.</td>
</tr>
<tr>
<td><code>er.saml.maxassertiontime</code></td>
<td></td>
<td>Specifies the maximum number of seconds allowed between user's authentication and processing of the AuthNResponse message.</td>
</tr>
<tr>
<td><code>wgserv-</code></td>
<td><code>7200</code></td>
<td>Sets the maximum number of seconds difference between Tableau Server time and the time of the assertion creation (based on the IdP server time) that still allows the message to be processed.</td>
</tr>
<tr>
<td><code>er.saml.responseskew</code></td>
<td><code>180</code></td>
<td>Controls whether there is a session lifetime for server sessions. Set this to <code>true</code> to configure a server session lifetime.</td>
</tr>
<tr>
<td><code>wgserv-</code></td>
<td><code>false</code></td>
<td>The number of minutes a server session</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>limit</td>
<td></td>
<td>lasts if a session lifetime is set. The default is 1440 minutes (24 hours). If <code>wgserver.session.apply_lifetime_limit</code> is false (the default) this is ignored.</td>
</tr>
<tr>
<td>wgserver.session.idle_limit</td>
<td>240</td>
<td>The number of minutes of idle time before a sign-in to the web application times out.</td>
</tr>
<tr>
<td>wgserver.trusted_hosts</td>
<td></td>
<td>IP address or host names of web servers that request trusted tickets from Tableau Server. This command can contain multiple comma and space-separated values enclosed by double quotes, as in this example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>tabadmin set wgserver.trusted_hosts host1, host2</code></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The values you specify overwrite previous settings. Therefore, you must include the full list of hosts in the <code>set</code> command. (You cannot amend the list of hosts by running the <code>set</code> command repeatedly.) The web servers you specify must use static IP addresses, even if you use host names (learn more).</td>
</tr>
<tr>
<td>wgserver.trustedticket.use_deprecated_v2_tickets</td>
<td>false</td>
<td>Specifies whether Tableau Server should return a legacy URL format for trusted ticket requests. The legacy URL format includes a 24 character, Base64-encoded string. Beginning with Tableau Server 10.2, the URL that is returned has been updated and includes a Base64-encoded UUID and a 24 character</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>wgserver.unrestricted_ticket</td>
<td>false</td>
<td>Specifies whether to extend access to server resources for users authenticated by trusted tickets. Default behavior allows users to access views only. Setting this to true allows users with valid trusted tickets to access server resources (projects, workbooks, and so on) as if they had signed in using their credentials.</td>
</tr>
<tr>
<td>workerX.gateway.port</td>
<td>80 (443 if SSL)</td>
<td>External port that Apache listens on for workerX. worker0.gateway.port is Tableau Server’s external port. In a distributed environment, worker0 is the primary Tableau Server.</td>
</tr>
<tr>
<td>workerX.vizqlserver.procs</td>
<td># of processes</td>
<td>Number of VizQL servers.</td>
</tr>
<tr>
<td>workerX.vizqlserver.port</td>
<td>9100</td>
<td>Base port for the vizQL server on workerX.</td>
</tr>
<tr>
<td>zookeeper.config.dataLogDir</td>
<td></td>
<td>Specifies the directory and file path for ZooKeeper transaction logs. By default ZooKeeper transaction logs are written to the Tableau data directory (for example c:\Tableau\Tableau Server\data\tabsvc\zookeeper\0\data). Use this option to specify a different location.</td>
</tr>
<tr>
<td>Option</td>
<td>Default Value</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Drive and path apply to all nodes in a cluster. The location will be created if it does not exist. The drive must exist and be writable on all nodes. This should not be a UNC path to a share.</td>
<td></td>
<td>ZooKeeper recommends that transaction logs be written to a dedicated drive to optimize performance.</td>
</tr>
<tr>
<td>Example: tabadmin set zoo-keeper.config.dataLogDir &quot;d:\Tableau\Server\zookeeper&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Restore a Setting to its Default Value**

You can restore the default value for a Tableau Server configuration setting by doing the following:

1. Stop the server.

2. Still in the bin directory, restore the default value for a particular setting by typing the following:

   `tabadmin set option-name --default`

   For example, to set the tabadmin `vizqlserver.session.expiry.timeout` option back to its default value of 30 minutes, you would type the following:

   `tabadmin set vizqlserver.session.expiry.timeout --default`

   Alternatively, you can use the shorter `-d` command. For example:
3. Next, run the configure command:

```bash
tabadmin configure
```

4. **Start the server.**

**tabcmd**

You can use the tabcmd command-line utility on a Windows computer to create scripts to automate administrative tasks on your Tableau Server site. For example, creating or deleting users, projects, and groups.

**Note:** The utility is installed automatically on the primary server node when you install Tableau Server, but the tabcmd Setup program for installing the utility on other computers is not.

Prior to version 10.1, the tabcmd Setup program was included on the primary node when you installed Tableau Server. If you have Tableau Server 10.0.x or earlier, you can find TabcmdInstaller.exe in `<server installation location>\<version>\extras`. For example: D:\Tableau\Tableau Server-10.0\extras\TabcmdInstaller.exe.

**Install tabcmd**

When Tableau Server is upgraded to a new version, if an updated version of tabcmd is required, you can download it from the Tableau Alternate Downloads Site (link below) to avoid issues caused by version incompatibilities.

This site contains tabcmd installers for Tableau Server 10.1 and later. Make sure you download the version that matches your server version and is compatible with the computer from which you’ll run the commands. If you need the tabcmd installer for a version of Tableau Server prior to 10.1, see the note above.
Download tabcmd

Tableau recommends that you install tabcmd to a folder named `tabcmd` at the root of the C:\ drive (`C:\tabcmd`), for convenience when using tabcmd, and to accommodate some limitations with the Windows operating system.

**Note** The tabcmd Setup program does not add the tabcmd directory to the Windows PATH variable. You can add it manually, or you can include the full path to tabcmd each time you call it.

How to use tabcmd

The basic steps for using tabcmd are as follows:

1. Open the Command Prompt as an administrator.

2. Change to the directory where tabcmd is installed.

   If you are using tabcmd on the Tableau Server primary node, change to the Tableau Server bin folder. For example:

   ```
cd C:\Program Files\Tableau\Tableau Server\10.2\bin
   ```

   If you installed tabcmd on a computer other than the primary node, change to the directory where you installed tabcmd.

3. Run the tabcmd command.

When you use tabcmd, you must establish an authenticated server session. The session identifies the server or Tableau Online site and the user running the session. You can start a session first, and then specify your command next, or you can start a session and execute a command all at once. If you are using tabcmd to perform more than one task, you must run tasks one after another (serially), rather than in parallel.
Commands (such as `login`) and the options (such as `-s, -u, etc.) are not case sensitive, but the values you provide (such as `User@Example.com`) are case sensitive.

**Examples**

The following command demonstrates starting a session with the Tableau Server named `tabserver.myco.com`:

```
tagcmd login -s http://tabserver.mycompany.com -u admin -p mypassword
```

The next example shows a command that deletes a workbook named `Sales_Workbook`:

```
tagcmd delete "Sales_Workbook"
```

Here’s how to accomplish all of the above with one command—note that you do not need `login` here:

```
tagcmd delete "Sales_Workbook" -s http://tabserver.mycompany.com -u admin -p mypassword
```

A Tableau Server can run multiple sites. When a workbook is on the Default site of a multi-site server you don't need to specify Default, the above command is sufficient. However, if the command applies to something on a site other than Default, you need to specify the site ID for that site (see `login`). Here’s the same command for a workbook that’s on the West Coast Sales site (site ID `wsales`):

```
tagcmd delete "Sales_Workbook" -s http://tabserver.mycompany.com -t wsales -u admin -p mypassword
```

The options `-s, -t, -u, and -p` are among the `tagcmd` global variables, which can be used with any command.

For more information, see `tagcmd` Commands.
Status messages and logs

When a command is successful, tabcmd returns a status code of zero. A full error message for non-zero status codes is printed to `stderr`. In addition, informative or progress messages may be printed to `stdout`.

A full log named `tabcmd.log` that includes debugging, progress, and error messages is written to `C:\Users\<username>\AppData\Local\Tableau`.

tabcmd Global Options

The table below shows the options that are used by all commands. The `--server`, `--user`, and `--password` options are required at least once to begin a session. An authentication token is stored so subsequent commands can be run without including these options. This token remains valid for five minutes after the last command that used it.

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h</td>
<td>--help</td>
<td></td>
<td>Displays the help for the command.</td>
</tr>
<tr>
<td>-c</td>
<td>--use-certificate</td>
<td></td>
<td>Use client certificate to sign in. Required when mutual SSL is enabled. For more information, see Configure External SSL.</td>
</tr>
<tr>
<td>-s</td>
<td>--server</td>
<td>Tableau Server URL</td>
<td>Required at least once to begin session.</td>
</tr>
<tr>
<td>-u</td>
<td>--user</td>
<td>Tableau Server username</td>
<td>Required at least once to begin session.</td>
</tr>
<tr>
<td>-p</td>
<td>--password</td>
<td>Tableau Server password</td>
<td>Required at least once to begin session. You can alternatively use the <code>-P</code> option.</td>
</tr>
<tr>
<td>--password-</td>
<td>filename.txt</td>
<td></td>
<td>Allows the password to be stored</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>file</td>
<td></td>
<td>in the given file rather than the command line for increased security.</td>
</tr>
<tr>
<td>-t</td>
<td>--site</td>
<td>Tableau Server site ID</td>
<td>Indicates that the command applies to the site specified by the site ID. If you do not specify a site, the Default site is assumed. Applies only to servers with multiple sites.</td>
</tr>
<tr>
<td>-x</td>
<td>--proxy</td>
<td>Host:Port</td>
<td>Uses the specified HTTP proxy.</td>
</tr>
<tr>
<td></td>
<td>--no-prompt</td>
<td></td>
<td>When specified, the command will not prompt for a password. If no valid password is provided the command will fail.</td>
</tr>
<tr>
<td></td>
<td>--no-proxy</td>
<td></td>
<td>When specified, an HTTP proxy will not be used.</td>
</tr>
<tr>
<td></td>
<td>--no-cert-check</td>
<td></td>
<td>When specified, tabcmd (the client) does not validate the server’s SSL certificate.</td>
</tr>
<tr>
<td></td>
<td>--[no-]cookie</td>
<td></td>
<td>When specified, the session id is saved on login so subsequent commands will not need to log in. Use the no- prefix to not save the session id. By default the session is saved.</td>
</tr>
<tr>
<td></td>
<td>--timeout</td>
<td>seconds</td>
<td>Waits the specified number of seconds for the server to complete processing the command. By default the process will timeout in</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td></td>
<td>30 seconds.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Specifies the end of options on the command line. You can use -- to indicate to \texttt{tabcmd} that anything that follows -- should not be interpreted as an option setting and can instead be interpreted as a value for the command. This is useful if you need to specify a value in the command that includes a hyphen. The following example shows how you might use -- in a \texttt{tabcmd} command, where \texttt{430105/Sheet1} is a required value for the \texttt{export} command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>\texttt{tabcmd export --csv -f &quot;D:\export10.csv&quot; -- 430105/Sheet1}</td>
</tr>
</tbody>
</table>

**tabcmd Commands**

Here are the commands that can be used with the tabcmd command line tool:

- \texttt{addusers} (to group)
- \texttt{creategroup}
- \texttt{createproject}
- \texttt{createsite}
- \texttt{createsiteusers}
- \texttt{createusers}
- \texttt{delete \{workbook-name\} or \{datasource-name\}}
- \texttt{deletegroup}
- \texttt{deleteproject}
- \texttt{deletesite}
addusers group-name

Adds users to the specified group.

Example

tabcmd addusers "Development" --users "users.csv"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--users</td>
<td></td>
<td>filename.csv</td>
<td>Add the users in the given file to the specified group. The file should be a simple list with one user name per line. User names are not case sensitive. The users should already be</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>--[no-]complete</td>
<td></td>
<td>When set to complete this option requires that all rows be valid for any change to succeed. If not specified, --complete is used.</td>
</tr>
</tbody>
</table>

creategroup group-name

Creates a group. Use addusers (for local groups) and syncgroup (for Active Directory groups) commands to add users after the group has been created.

Example

tabcmd creategroup "Development"

createproject project-name

Creates a project.

Example

tabcmd createproject -n "Quarterly_Reports" -d "Workbooks showing quarterly sales reports."

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>--name</td>
<td>name</td>
<td>Specify the name of the project that you want to create.</td>
</tr>
<tr>
<td>-d</td>
<td>--description</td>
<td>description</td>
<td>Specify a description for the project.</td>
</tr>
</tbody>
</table>
Creates a site.

Examples

Create a site named West Coast Sales. A site ID of WestCoastSales will be automatically created, the site will have no storage quota limit, and site administrators will be able to add and remove users:

```
tabcmd createsite "West Coast Sales"
```

Create a site named West Coast Sales with a site ID of wsales:

```
tabcmd createsite "West Coast Sales" -r "wcoast"
```

Prevent site administrators from adding users to the site:

```
tabcmd createsite "West Coast Sales" --no-site-mode
```

Set a storage quota, in MB:

```
tabcmd createsite "West Coast Sales" --storage-quota 100
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r</td>
<td>--url</td>
<td>site ID</td>
<td>Used in URLs to specify the site. Different from the site name.</td>
</tr>
<tr>
<td>--user-quota</td>
<td></td>
<td>number of users</td>
<td>Maximum number of users that can be added to the site.</td>
</tr>
<tr>
<td>--[no-]site-mode</td>
<td></td>
<td></td>
<td>Allow or deny site administrators the ability to add users to or remove users from the site.</td>
</tr>
<tr>
<td>--storage-quota</td>
<td></td>
<td>number of</td>
<td>In MB, the amount of workbooks,</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>quota</td>
<td>MB</td>
<td></td>
<td>extracts, and data sources that can be stored on the site.</td>
</tr>
</tbody>
</table>

**Top**

createsiteusers *filename.csv*

Adds users to a site, based on information supplied in a comma-separated values (CSV) file. If the user is not already created on the server, the command creates the user before adding that user to the site.

The CSV file must contain one or more user names and can also include (for each user) a password, full name, role, administrator level, publisher (yes/no), and email address. For information about the format of the CSV file, see CSV Import File Guidelines. As an alternative to including role, administrator level, and publisher permissions in the CSV file, you can pass role information to the command using the `--role` option.

By default, users are added to the site that you are logged in to. To add users to a different site, include the global `--site` option and specify that site. (You must have permissions to create users on the site you specify.)

If the server contains multiple sites, you cannot assign the `ServerAdministrator` role to a user by using the `createsiteusers` command. (Use `createusers` instead.) If you specify the `ServerAdministrator` role for the `role` option, the command returns an error. If the CSV file includes `System` as value for administrator, the value is ignored and the user is assigned the `Unlicensed` role. However, if the server contains only one site (the default site), you can assign the `ServerAdministrator` role or specify `system` for the administrator value; in that case, the `createsiteusers` command works like the `createusers` command.
By default, this command creates users using a synchronous operation (it waits for all operations to complete before proceeding). You can use the `--no-wait` option to specify an asynchronous operation.

Local authentication

If the server is configured to use local authentication, the information in the CSV file is used to create users.

Active Directory authentication

If the server is configured to use Active Directory authentication, user information is imported from Active Directory to the server. In that case, any password and friendly name information in the CSV file is ignored. Further, if a user is specified in the CSV file but there is no corresponding user in Active Directory, the user is not added to Tableau Server. For Active Directory users, the user name is not guaranteed to be unique across domains, therefore you must include the domain as part of the user name (for example, `example\Adam` or `adam@example.com`).

While these can be sent either as `domain/username` or `username@domain.com`, we recommend using the `domain/username` format. See User Management in Active Directory Deployments for more information.

Example

tabcmd createsiteusers "users.csv" --role "Interactor"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--admin-type</code></td>
<td></td>
<td><code>Site or None</code></td>
<td>(Deprecated. Use the <code>--role</code> option instead.) Assigns or removes the site administrator right for any user who does not already have an administrator setting in the CSV file. The default is <code>None</code></td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>for new users and unchanged for existing users. If the server contains multiple sites; system administrators cannot be created or demoted using createsiteusers. <em>(Use createusers instead.)</em></td>
</tr>
<tr>
<td>--complete</td>
<td></td>
<td></td>
<td>Requires that all rows be valid for any change to succeed. This is the default setting.</td>
</tr>
<tr>
<td>--license</td>
<td>Interactor, Viewer, or Unlicensed</td>
<td></td>
<td>(Deprecated. Use the --role option instead.) Specifies the license level for any user who does not already have a license level setting in the CSV file. The default is Unlicensed for new users and unchanged for existing users.</td>
</tr>
<tr>
<td>--no-complete</td>
<td></td>
<td></td>
<td>Specifies that the command should make changes on the</td>
</tr>
<tr>
<td><strong>Option (short)</strong></td>
<td><strong>Option (long)</strong></td>
<td><strong>Argument</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>--no-publisher</td>
<td></td>
<td>server even if not all rows contain valid information. Rows that contain invalid information are skipped.</td>
</tr>
<tr>
<td></td>
<td>--nowait</td>
<td></td>
<td>Do not wait for asynchronous jobs to complete.</td>
</tr>
<tr>
<td></td>
<td>--publisher</td>
<td></td>
<td>(Deprecated. Use the --role option instead.) Disallows publishing rights for any users who do not already have a publisher setting in the CSV file. This is a default value for new users.</td>
</tr>
<tr>
<td>-r</td>
<td>--role</td>
<td>ServerAdministrator, SiteAdministrator, Publisher, Interactor, ViewerWithPublish, Viewer, UnlicensedWithPublish, or</td>
<td>Specifies a site role for any user who does not already have a role specified in the CSV file. The default is Unlicensed for new users and unchanged for existing users.</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unlicensed</td>
<td>If you have a user-based server installation, and if the command creates a new user but you have already reached the limit on the number of licenses for your users, the user is added as an unlicensed user.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> On Tableau Server on-premises, you cannot assign the Server-Administrator role if the server has more than one site. In that case, use the <code>createuser</code> command.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> If you specify a role option, you cannot also include <code>license, publisher, no-publisher, or administrator</code> options.</td>
</tr>
<tr>
<td>--silent--</td>
<td></td>
<td></td>
<td>Do not display progress mes-</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>progress</td>
<td></td>
<td></td>
<td>sages for the command.</td>
</tr>
</tbody>
</table>

To

`createusers filename.csv`

Create users in Tableau Server, based on information supplied in a comma-separated values (CSV) file.

The CSV file must contain one or more user names and can also include (for each user) a password, full name, role, administrator level, publisher (yes/no), and email address. For information about the format of the CSV file, see CSV Import File Guidelines. As an alternative to including role, administrator level, and publisher permissions in the CSV file, you can pass role information to the command using the `--role` option.

If the server has only one site (the default site), the user is created and added to the site. If the server has multiple sites, the user is created but is not added to any site. To add users to a site, use `createsiteusers`.

If you have a user-based server installation, and if the command creates a new user but you have already reached the limit on the number of licenses for your users, the user is added as an unlicensed user.

Local authentication

If the server is configured to use local authentication, the information in the CSV file is used to create users.

Active Directory authentication

If the server is configured to use Active Directory authentication, user information is imported from Active Directory to the server. In that case, any password and friendly name information in the CSV file is ignored. Further, if a user is specified in the CSV file but there is no
corresponding user in Active Directory, the user is not added to Tableau Server. For Active Directory users, the user name is not guaranteed to be unique across domains, therefore you must include the domain as part of the user name (for example, example\Adam or adam@example.com.

While these can be sent either as domain/username or username@domain.com, we recommend using the domain/username format. See User Management in Active Directory Deployments for more information.

Example

tabcmd createusers "users.csv" --role "ServerAdministrator"

tabcmd createusers "users.csv"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--admin-type</td>
<td>--admin-type</td>
<td>Site or None</td>
<td>(Deprecated. Use the --role option instead.) Assigns or removes the site administrator right for any user who does not already have an administrator setting in the CSV file. The default is None for new users and unchanged for existing users.</td>
</tr>
<tr>
<td>--complete</td>
<td>--complete</td>
<td></td>
<td>Requires that all rows be valid for any change to succeed. This is the default setting.</td>
</tr>
<tr>
<td>--license</td>
<td>--license</td>
<td>Interactor, Viewer, or Unlicensed</td>
<td>(Deprecated. Use the --role option instead.) Specifies the license level for any user who does not already</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>have a license level setting in the CSV file. The default is Unlicensed for new users and unchanged for existing users.</td>
</tr>
<tr>
<td><strong>--no-complete</strong></td>
<td></td>
<td></td>
<td>Specifies that the command should make changes on the server even if not all rows contain valid information. Rows that contain invalid information are skipped.</td>
</tr>
<tr>
<td><strong>--no-publisher</strong></td>
<td></td>
<td></td>
<td>(Deprecated. Use the --role option instead.) Disallows publishing rights for any users who do not already have a publisher setting in the CSV file. This is a default value for new users.</td>
</tr>
<tr>
<td><strong>--nowait</strong></td>
<td></td>
<td></td>
<td>Do not wait for asynchronous jobs to complete.</td>
</tr>
<tr>
<td><strong>--pub-</strong></td>
<td></td>
<td></td>
<td>(Deprecated. Use the --</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>-r</td>
<td>--role</td>
<td>ServerAdministrator, SiteAdministrator, Publisher, Interactor, ViewerWithPublish, Viewer, UnlicensedWithPublish, or Unlicensed</td>
<td>Specifies a role for any user who does not already have a role specified in the CSV file. The default is Unlicensed for new users and unchanged for existing users. On a multi-site server, the command does not assign the user to a site. Therefore, the only roles that the command will assign are ServerAdministrator and Unlicensed. In that case, if you specify a different role (like Publisher or Viewer), the command assigns the Unlicensed role. On a single-site server, the...</td>
</tr>
<tr>
<td>lisher</td>
<td></td>
<td></td>
<td>role option instead.) Assigns publishing rights for any user who does not already have a publisher setting in the CSV file. The default is no publishing rights (equivalent to --no-publish) for new users and unchanged for existing users.</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>user is created and added to the default site using the role that you specify.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If you have a user-based server installation, and if the command creates a new user but you have already reached the limit on the number of licenses for your users, the user is added as an unlicensed user.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Note:</strong> If you specify a role option, you cannot also include license, publisher, no-publisher, or administrator options.</td>
</tr>
<tr>
<td>--silent-progress</td>
<td></td>
<td></td>
<td>Do not display progress messages for the command.</td>
</tr>
</tbody>
</table>

**Top**

delete *workbook-name* or *datasource-name*

Deletes the specified workbook or data source from the server.
This command takes the name of the workbook or data source as it is on the server, not the file name when it was published.

Example

tabcmd delete "Sales_Analysis"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r</td>
<td>--project</td>
<td>Project name</td>
<td>The name of the project containing the workbook or data source you want to delete. If not specified, the “Default” project is assumed.</td>
</tr>
<tr>
<td></td>
<td>--workbook</td>
<td>Workbook name</td>
<td>The name of the workbook you want to delete.</td>
</tr>
<tr>
<td></td>
<td>--data-source</td>
<td>Data source name</td>
<td>The name of the data source you want to delete.</td>
</tr>
</tbody>
</table>

Top

deletegroup group-name

Deletes the specified group from the server.

Example

tabcmd deletegroup "Development"

deleteproject project-name

Deletes the specified project from the server.

Example

tabcmd deleteproject "Designs"
deletesite  *site-name*

Deletes the specified site from the server.

**Example**

```text
tabcmd deletesite "Development"
```

**Top**

deletesiteusers  *filename.csv*

Removes users from the site that you are logged in to. The users to be removed are specified in a file that contains a simple list of one user name per line. (No additional information is required beyond the user name.)

By default, if the server has only one site, or if the user belongs to only one site, the user is also removed from the server. On a Tableau Server Enterprise installation, if the server contains multiple sites, users who are assigned the role of **Server Administrator** are removed from the site but are not removed from the server.

If the user owns content, the user’s role is change to **Unlicensed**, but the user is not removed from the server or the site. The content is still owned by that user. To remove the user completely, you must change the owner of the content and then try removing the user again.

If the user was imported from Active Directory, the user is removed from the site and possibly from the server. However, the user is not deleted from Active Directory.

**Example**

```text
tabcmd deletesiteusers "users.csv"
```

**Top**

deleteusers  *filename.csv*

Deletes the users listed in the specified comma-separated values (CSV) file.
The CSV file should contain a simple list of one user name per line.

Example

tabcmd deleteusers "users.csv"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>--[no-- -]complete</td>
<td></td>
<td>When set to --complete this option requires that all rows be valid for any change to succeed. If not specified, --complete is used.</td>
</tr>
</tbody>
</table>

editdomain

Changes the nickname or full domain name of an Active Directory domain on the server. A domain “nickname” is the Windows NetBIOS domain name.

You can modify the nickname for any domain the server is using. In general, you can modify the full domain name for any domain except the one that you used to sign in. However, if the user name that you are currently signed in with exists in both the current domain and the new domain, you can modify the full name for the current domain.

Review User Management in Active Directory Deployments to understand how multiple domains, domain name mapping, and user names interact with Tableau Server.

To see a list of domains, use listdomains.

Examples

tabcmd editdomain --id 2 --nickname "new-nickname"
tabcmd editdomain --id 3 --name "new-name"

<table>
<thead>
<tr>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--id</td>
<td>Domain ID</td>
<td>The ID of domain to change. To get a list of domains</td>
</tr>
<tr>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IDs, use use listdomains.</td>
</tr>
<tr>
<td>--name</td>
<td>Domain name</td>
<td>The new name for the domain.</td>
</tr>
<tr>
<td>--nickname</td>
<td>Domain nickname</td>
<td>The new nickname for the domain.</td>
</tr>
</tbody>
</table>

**Top**

tabcmd editsite site-name

Changes the name of a site or its web folder name. You can also use this command to allow or deny site administrators the ability to add and remove users. If site administrators have user management rights, you can specify how many users they can add to a site.

**Examples**

tabcmd editsite wc_sales --site-name "West Coast Sales"

tabcmd editsite wc_sales --site-id "wsales"

tabcmd editsite wsales --status ACTIVE

tabcmd editsite wsales --user-quota 50

<table>
<thead>
<tr>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--site-name</td>
<td>Name to change the site to</td>
<td>The name of the site that's displayed.</td>
</tr>
<tr>
<td>--site-id</td>
<td>The site ID to change the site to</td>
<td>Used in the URL to uniquely identify the site.</td>
</tr>
<tr>
<td>--user-quota</td>
<td>Number of users</td>
<td>Maximum number of users who can be members of the site.</td>
</tr>
<tr>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>--[no-]site-mode</td>
<td></td>
<td>Allow or prevent site administrators from adding users to the site.</td>
</tr>
<tr>
<td>--status</td>
<td>ACTIVE or SUSPENDED</td>
<td>Activate or suspend a site.</td>
</tr>
<tr>
<td>--storage-quota</td>
<td>Number of MB</td>
<td>In MB, the amount of workbooks, extracts, and data sources that can be stored on the site.</td>
</tr>
</tbody>
</table>

**Top**

**export**

Exports a view or workbook from Tableau Server and saves it to a file. This command can also export just the data used for a view.

Note the following when you use this command:

- **Permissions**: To export, you must have the Export Image permission. By default, this permission is Allowed or Inherited for all roles, although permissions can be set per workbook or view.

- **Exporting data**: To export just the data for a view, use the --csv option. This exports the summary data used in a view to a .csv file.

- **Specifying the view, workbook, or data to export**:
  - Use part of the URL to identify what to export, specifically the "work-book/view" string as it appears in the URL for the workbook or view. Do not use the “friendly name,” and exclude the :iid=<n> session ID at the end of the URL.

For example, the Tableau sample view Global Temperatures in the Regional workbook has a URL similar to this: <server_name>/#/views/Regional/GlobalTemperatures?:iid=3
To export the *Global Temperatures* view, use the string `Region-al/GlobalTemperatures`.

Do not use `Regional/Global Temperatures`, or `Regional/GlobalTemperatures? iid=3`.

- If the server is running multiple sites and the view or workbook is on a site other than Default, Use `-t <site_id>`.

- To export a workbook, get the URL string by opening a view in the workbook, and include the view in the string you use.

  In the above example, to export the *Regional* workbook, use the string `Region-al/GlobalTemperatures`.

- To export a workbook, it must have been published with **Show Sheets as Tabs** selected in the Tableau Desktop Publish dialog box.

**The saved file's format:** Your format options depend on what's being exported. A workbook can only be exported as a PDF using the `--fullpdf` argument. A view can be exported as a PDF (`--pdf`) or a PNG (`--png`).

**The saved file's name and location** (optional): If you don't provide a name, it will be derived from the view or workbook name. If you don't provide a location, the file will be saved to your current working directory. Otherwise, you can specify a full path or one that's relative to your current working directory.

   **Note:** You must include a file name extension such as `.csv` or `.pdf`. The command does not automatically add an extension to the file name that you provide.

**Dashboard web page objects not included in PDF exports:** A dashboard can optionally include a web page object. If you are performing an export to PDF of a dashboard that includes a web page object, the web page object won't be included in the...
PDF.

- **Non-ASCII characters and PDF exports**: If you are exporting a view or workbook with a name that includes a character outside the ASCII character set, you need to URL encode (or percent-encode) the character.

  For example, if your command includes the city Zürich, you need to URL encode it as Z%C3%BCrich:

  ```
tabcmd export "Cities/Sheet1?locationCity=Z%C3%BCrich" -fullpdf
  ```

**Clearing the Cache to Use Real-Time Data**

You can optionally add the URL parameter `?:refresh=yes` to force a fresh data query instead of pulling the results from the cache. If you are using tabcmd with your own scripting and the `refresh` URL parameter is being used a great deal, this can have a negative impact on performance. It's recommended that you use `refresh` only when real-time data is required—for example, on a single dashboard instead of on an entire workbook.

**Examples**

**Views**

```
tabcmd export "Q1Sales/Sales_Report" --csv -f "Weekly-Report.csv"
```

```
tabcmd export -t Sales "Sales/Sales_Analysis" --pdf -f "C:\Tableau_Workbooks\Weekly-Reports.pdf"
```

```
tabcmd export "Finance/InvestmentGrowth" --png
```

```
tabcmd export "Finance/InvestmentGrowth?:refresh=yes" --png
```

**Workbooks**

```
tabcmd export "Q1Sales/Sales_Report" --fullpdf
```
```
tabcmd export "Sales/Sales_Analysis" --fullpdf --pagesize tabloid -f "C:\Tableau_Workbooks\Weekly-Reports.pdf"
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>--filename</td>
<td>The name and extension to use for the saved file</td>
<td>Saves the file with the given filename.</td>
</tr>
<tr>
<td>--csv</td>
<td></td>
<td></td>
<td>View only. Export the view’s data (summary data) in CSV format.</td>
</tr>
<tr>
<td>--pdf</td>
<td></td>
<td></td>
<td>View only. Export as a PDF.</td>
</tr>
<tr>
<td>--png</td>
<td></td>
<td></td>
<td>View only. Export as an image in PNG format.</td>
</tr>
<tr>
<td>--fullpdf</td>
<td></td>
<td></td>
<td>Workbook only. Export as a PDF. The workbook must have been published with Show Sheets as Tabs enabled.</td>
</tr>
<tr>
<td>--pagelay-out</td>
<td>landscape, portrait</td>
<td></td>
<td>Sets the page orientation of the exported PDF. If not specified, its Tableau Desktop setting will be used.</td>
</tr>
<tr>
<td>--pagesize</td>
<td>unspecified, letter, legal, notefolio, tabloid, ledger, statement, executive, a3, a4, a5, b4, b5</td>
<td></td>
<td>Sets the page size of the exported PDF. Default is letter.</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>--width</td>
<td>Number of pixels</td>
<td>Sets the width. Default is 800 px.</td>
</tr>
<tr>
<td></td>
<td>--height</td>
<td>Number of pixels</td>
<td>Sets the height. Default is 600 px.</td>
</tr>
</tbody>
</table>

**Top**

**get url**

Gets the resource from Tableau Server that's represented by the specified (partial) URL. The result is returned as a file.

Note the following when you use this command:

- **Permissions**: To get a file, you must have the Download/Web Save As permission. By default, this permission is allowed or inherited for all roles, although permissions can be set per workbook or view.

- **Specifying a view or workbook to get**: You specify a view to get using the 
  
  "/views/<workbookname>/<viewname>.<extension>" string, and specify a workbook to get using the 
  
  
  
  
  "/workbooks/<workbookname>.<extension>" string. Replace 
  
  
  <workbookname> and <viewname> with the names of the workbook and view as they appear in the URL when you open the view in a browser and replace 
  
  <extension> with the type of file you want to save. Do not use the session ID at the end of the URL (?:iid=<n>) or the "friendly" name of the workbook or view.

For example, when you open a view *Regional Totals* in a workbook named *Metrics Summary*, the URL will look similar to this:

/views/MetricsSummary_1/RegionalTotals?:iid=1
Use the string /views/MetricsSummary_1/RegionalTotals.<extension> to get the view.

Use the string /workbooks/MetricsSummary_1.<extension> to get the workbook.

- **File extension:** The URL must include a file extension. The extension determines what's returned. A view can be returned in PDF, PNG, or CSV (summary data only) format. A Tableau workbook is returned as a TWB if it connects to a published data source or uses a live connection, or a TWBX if it connects to a data extract.

  **Note:** If you are downloading a view to a PDF or PNG file, and if you include a --filename parameter that includes the .pdf or .png extension, you do not have to include a .pdf or .png extension in the URL.

- **The saved file's name and location** (optional): The name you use for --filename should include the file extension. If you don’t provide a name and file extension, both will be derived from the URL string. If you don’t provide a location, the file is saved to your current working directory. Otherwise, you can specify a full path or one that's relative to your current working directory.

- **PNG size** (optional): If the saved file is a PNG, you can specify the size, in pixels, in the URL.

**Clearing the cache to use real-time data**

You can optionally add the URL parameter ?refresh=yes to force a fresh data query instead of pulling the results from the cache. If you are using tabcmd with your own scripting, using the refresh parameter a great deal can have a negative impact on performance. It’s recommended that you use refresh only when real-time data is required—for example, on a single dashboard instead of on an entire workbook.

**Examples**
Views

tabcmd get "/views/Sales_Analysis/Sales_Report.png" --filename "Weekly-Report.png"

tabcmd get "/views/Finance/InvestmentGrowth.pdf" -f "Q1Growth.pdf"

tabcmd get "/views/Finance/InvestmentGrowth" -f "Q1Growth.pdf"

tabcmd get "/views/Finance/InvestmentGrowth.csv"

tabcmd get "/views/Finance/InvestmentGrowth.png?:size=640,480" -f growth.png

tabcmd get "/views/Finance/InvestmentGrowth.png?:refresh=yes" -f growth.png

Workbooks

tabcmd get "/workbooks/Sales_Analysis.twb" -f "C:\Tableau_Workbooks\Weekly-Reports.twb"

Top

initialuser

Create the initial administrative user on a server that does not have an initial administrative user defined.

Note: The tabcmd initialuser command does not require authentication to Tableau Server, but you must run the command on the primary server node.

Examples

tabcmd initialuser --username "admin" --password "P@ssword!"
tabcmd initialuser --username "admin" --password "P@ssword!" --friendly "Tableau Admin"

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-f</td>
<td>--friendly</td>
<td>Display name for the user</td>
<td>Creates the initial administrative user with the display name.</td>
</tr>
</tbody>
</table>

**Top**

listdomains

Displays a list of the Active Domain domains that are in use on the server, along with their nicknames and IDs. If the server is configured to use local authentication, the command returns only the domain name local.

**Example**

tabcmd listdomains

listsites

Returns a list of sites to which the logged in user belongs.

**Example**

tabcmd listsites --username adam --password mypassword

**Top**

login

Logs in a Tableau Server user.

Use the --server,--site,--username,--password global options to create a session.
Note: When you use the `tabcmd login` command, you cannot use SAML single sign-on (SSO), even if the server is configured to use SAML. To log in, you must pass the user name and password of a user who has been created on the server. You will have the permissions of the Tableau Server user that you're signed in as. For more information, see Set Users’ Site Roles and Content Access and Ownership.

If you want to log in using the same information you've already used to create a session, just specify the `--password` option. The server and user name stored in the cookie will be used.

If the server is using a port other than 80 (the default), you will need to specify the port.

You need the `--site (-t)` option only if the server is running multiple sites and you are logging in to a site other than the Default site. If you do not provide a password you will be prompted for one. If the `--no-prompt` option is specified and no password is provided the command will fail.

Once you log in, the session will continue until it expires on the server or the `logout` command is run.

Example

Logs you in to the Tableau Server running on your local machine:

```
tabcmd login -s http://localhost -u jsmith -p p@ssw0rd!
```

Logs you in to the Sales site on sales-server:

```
tabcmd login -s http://sales-server -t Sales -u administrator -p p@ssw0rd!
```

```
tabcmd login -s http://sales-server:8000 -t Sales -u administrator -p p@ssw0rd!
```
Logs you in to the Sales site on sales-server using SSL but does not validate the server’s SSL certificate:

`tabcmd login --no-certcheck -s https://sales-server -t Sales -u administrator -p p@ssw0rd!`

Establishes a forward proxy and port for localhost:

`tabcmd login --proxy myfwdproxyserver:8888 -s http://localhost -u jsmith -p p@ssW0rd!`

Logs you in to the reverse proxy using SSL:

`tabcmd login -s https://myreverseproxy -u jsmith -p p@ssW0rd!`

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-s</td>
<td>--server</td>
<td>server URL</td>
<td>If you are running the command from an on-premises Tableau Server computer, you can use <code>http://localhost</code>. Otherwise, specify the computer’s URL, such as <code>http://bigbox.myco.com</code> or <code>http://bigbox</code>. For Tableau Online specify the URL <code>https://on-line.tableau.com</code>.</td>
</tr>
<tr>
<td>-t</td>
<td>--site</td>
<td>site ID</td>
<td>Include this option if the server has multiple sites, and you are logging in to a site other than the Default site. The site ID is used in the URL to uniquely identify the site. For example, a site named West Coast Sales might have a</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>-u</td>
<td>--username</td>
<td>user name</td>
<td>The user name of the user logging in. For Tableau Online, the user name is the user's email address.</td>
</tr>
<tr>
<td>-p</td>
<td>--password</td>
<td>password</td>
<td>Password for the user specified for <code>--username</code>. If you do not provide a password you will be prompted for one.</td>
</tr>
<tr>
<td>--password-file</td>
<td>filename.txt</td>
<td></td>
<td>Allows the password to be stored in the given file rather than the command line, for increased security.</td>
</tr>
<tr>
<td>-x</td>
<td>--proxy</td>
<td>Host:Port</td>
<td>Use to specify the HTTP proxy server and port for the tabcmd request.</td>
</tr>
<tr>
<td>--no-prompt</td>
<td></td>
<td></td>
<td>Do not prompt for a password. If no password is specified, the login command will fail.</td>
</tr>
<tr>
<td>--no-proxy</td>
<td></td>
<td></td>
<td>Do not use an HTTP proxy server.</td>
</tr>
<tr>
<td>--cookie</td>
<td></td>
<td></td>
<td>Saves the session ID on login. Subsequent commands will not require a login. This value is the default for the command.</td>
</tr>
<tr>
<td>--no-cookie</td>
<td></td>
<td></td>
<td>Do not save the session ID information after a successful login. Subsequent commands will require a login.</td>
</tr>
<tr>
<td>--timeout SECONDS</td>
<td>Number of seconds</td>
<td></td>
<td>The number of seconds the server should wait before processing the login com-</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mand. Default: 30 seconds.</td>
</tr>
</tbody>
</table>

**Top logout**

Logs out of the server.

**Example**

```
tabcmd logout
```

**publish filename.twb(x), filename.tds(x), or filename.tde**

Publishes the specified workbook (.twb(x)), data source (.tds(x)), or data extract (.tde) to Tableau Server.

If you are publishing a workbook, by default, all sheets in the workbook are published without database user names or passwords.

The permissions initially assigned to the workbook or data source are copied from the project that the file is published to. Permissions for the published resource can be changed after the file has been published.

If the workbook contains user filters, one of the thumbnail options must be specified.

**Example**

```
tabcmd publish "analysis.twbx" -n "Sales_Analysis" --db-username "jsmith" --db-password "p@ssw0rd"
```

```
tabcmd publish "analysis_sfdc.tde" -n "Sales Analysis" --oauth-username "username" --save-oauth
```

If the file is not in the same directory as tabcmd, include the full path to the file.

**Example**
```bash

tabcmd publish "C:\Tableau Workbooks\analysis.twbx" -n "Sales Analysis" --db-username "jsmith" --db-password "p@ssw0rd"

tabcmd publish "C:\Tableau Workbooks\analysis_sfdc.tde" -n "Sales Analysis" --oauth-username "username" --save-oauth
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>--name</td>
<td>Name of the workbook or data source on the server</td>
<td>If omitted, the workbook, data source, or data extract will be named after file-name.</td>
</tr>
<tr>
<td>-o</td>
<td>--overwrite</td>
<td></td>
<td>Overwrites the workbook, data source, or data extract if it already exists on the server.</td>
</tr>
<tr>
<td>-r</td>
<td>--project</td>
<td>Name of a project</td>
<td>Publishes the workbook, data source, or data extract into the specified project. Publishes to the “Default” project if not specified.</td>
</tr>
<tr>
<td></td>
<td>--db-username</td>
<td></td>
<td>Use this option to publish a database user name with the workbook, data source, or data extract.</td>
</tr>
<tr>
<td></td>
<td>--db-password</td>
<td></td>
<td>Use this option to publish a database password with the workbook, data source, or data extract.</td>
</tr>
<tr>
<td></td>
<td>--save-db-password</td>
<td></td>
<td>Stores the provided database password on the server.</td>
</tr>
<tr>
<td></td>
<td>--oauth-username</td>
<td>Email address of</td>
<td>Connects the user through a pre-configured OAuth connection, if the user</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the user account</td>
<td>already has a saved access token for the cloud data source specified in <code>--name</code>. Access tokens are managed in user preferences. For existing OAuth connections to the data source, use this option instead of <code>--db-username</code> and <code>--db-password</code>.</td>
</tr>
<tr>
<td><code>--save-oauth</code></td>
<td></td>
<td></td>
<td>Saves the credential specified by <code>--oauth-username</code> as an embedded credential with the published workbook or data source. Subsequently, when the publisher or server administrator signs in to the server and edits the connection for that workbook or data source, the connection settings will show this OAuth credential as embedded in the content. If you want to schedule extract refreshes after publishing, you must include this option with <code>--oauth-username</code>. This is analogous to using <code>--save-db-password</code> with a traditional database connection.</td>
</tr>
<tr>
<td><code>--thumbnail-user-name</code></td>
<td></td>
<td></td>
<td>If the workbook contains user filters, the thumbnails will be generated based on what the specified user can see. Cannot</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>--thumbnail-group</td>
<td></td>
<td>be specified when <code>--thumbnail-group</code> option is set.</td>
</tr>
<tr>
<td></td>
<td>--thumbnail-group</td>
<td></td>
<td>If the workbook contains user filters the thumbnails will be generated based on what the specified group can see. Cannot be specified when <code>--thumbnail-userame</code> option is set.</td>
</tr>
<tr>
<td></td>
<td>--tabbed</td>
<td></td>
<td>When a workbook with tabbed views is published, each sheet becomes a tab that viewers can use to navigate through the workbook. Note that this setting will override any sheet-level security.</td>
</tr>
<tr>
<td></td>
<td>--append</td>
<td></td>
<td>Append the extract file to the existing data source.</td>
</tr>
<tr>
<td></td>
<td>--replace</td>
<td></td>
<td>Use the extract file to replace the existing data source.</td>
</tr>
<tr>
<td></td>
<td>--disable-uploader</td>
<td></td>
<td>Disable the incremental file uploader.</td>
</tr>
<tr>
<td></td>
<td>--restart</td>
<td></td>
<td>Restart the file upload.</td>
</tr>
</tbody>
</table>

**Top**

**publishsamples**

**Description**

Publishes Tableau Sample workbooks to the specified project. Any existing samples will be overwritten.
Syntax

tabcmd publishsamples -n [project name] [Global options]

Options

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>--name</td>
<td>Name of the project to publish samples to (required)</td>
<td>Publishes the Tableau samples into the specified project. If the project name includes spaces, enclose the entire name in quotes.</td>
</tr>
</tbody>
</table>

Example

Publish samples to the Inside Sales project on the Default site, as user jsmith.

tabcmd publishsamples -n "Inside Sales" -t "" --t localhost --username jsmith --password p@ssw0rd

Top

refreshextracts workbook-name or datasource-name

Performs a full or incremental refresh of extracts belonging to the specified workbook or data source.

This command takes the name of the workbook or data source as it appears on the server, not the file name when it was published. Only an administrator or the owner of the workbook or data source is allowed to perform this operation.

Examples

tabcmd refreshextracts --datasource sales_ds

tabcmd refreshextracts --project "Sales External" --datasource sales_ds

tabcmd refreshextracts --workbook "My Workbook"
tabcmd refreshextracts --url SalesAnalysis

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--incremental</td>
<td>--incremental</td>
<td></td>
<td>Runs the incremental refresh operation.</td>
</tr>
<tr>
<td>--synchronous</td>
<td>--synchronous</td>
<td></td>
<td>Adds the full refresh operation to the queue used by the Backgrounder process, to be run as soon as a Backgrounder process is available. If a Backgrounder process is available, the operation is run immediately. The refresh operation appears on the Background Tasks report. During a synchronous refresh, tabcmd maintains a live connection to the server while the refresh operation is underway, polling every second until the background job is done.</td>
</tr>
<tr>
<td>--workbook</td>
<td>--workbook</td>
<td>Name of a workbook</td>
<td>The name of the workbook containing extracts to refresh. If the workbook has spaces in its name, enclose it in quotes.</td>
</tr>
<tr>
<td>--data-source</td>
<td>--data-source</td>
<td>Name of a data source</td>
<td>The name of the data source containing extracts to refresh.</td>
</tr>
<tr>
<td>--project</td>
<td>--project</td>
<td>Name of a project</td>
<td>Use with --workbook or --data-source to identify a workbook or data source in a project other than Default. If not specified, the Default project is assumed.</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>--url</td>
<td></td>
<td>URL name of a workbook</td>
<td>The name of the workbook as it appears in the URL. A workbook published as “Sales Analysis” has a URL name of “SalesAnalysis”.</td>
</tr>
</tbody>
</table>

**Top**

`removeusers group-name`

Removes users from the specified group.

**Example**

```
tabcmd removeusers "Development" --users "users.csv"
```

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--users</td>
<td></td>
<td>filename.csv</td>
<td>Remove the users in the given file from the specified group. The file should be a simple list with one user name per line.</td>
</tr>
<tr>
<td>--[no--]-complete</td>
<td></td>
<td></td>
<td>Requires that all rows be valid for any change to succeed. If not specified <code>--complete</code> is used.</td>
</tr>
</tbody>
</table>
Example

tabcmd runschedule "5AM Sales Refresh"

Top

set setting

Enables the specified setting on the server. Details about each setting can be seen on the Maintenance page on the server.

Use an exclamation mark in front of the setting name to disable the setting. You can enable or disable the following settings:

- allow_scheduling
- embedded_credentials
- remember_passwords_forever

Example

tabcmd set embedded_credentials

syncgroup group-name

Synchronizes a Tableau Server group with an Active Directory group. If the Tableau Server group does not already exist, it is created and synchronized with the specified Active Directory group.

If the group name itself includes an "@" (other than as the domain separator) you need to refer to the symbol using the hex format "\0x40".

Example

tabcmd syncgroup "Development"
tabcmd syncgroup "Dev\0x40Fremont"
**Note:** If you synchronize a group that you are a member of, changes that you make using this command do not apply to your user. For example, if you use this command to remove the administrator right from users in a group that you are a member of, you are still an administrator when the command finishes.

<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--admin</td>
<td>--administrator</td>
<td>System, Site, or None</td>
<td>(Deprecated. Some operations may no longer work. Use the --role option instead.) Assigns or removes the administrator right for users in the group. The None option removes the administrator right from all users in the group (except you, if you are a member of the group that you are synchronizing). If you do not include this option, users who are added to the group after you run the command are not assigned the administrator right.</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>--license</td>
<td>Interactor, Viewer, or Unlicensed</td>
<td></td>
<td>(Deprecated. Some operations may no longer work. Use the --role option instead.) Specifies the license level for users in the group.</td>
</tr>
<tr>
<td>--no-publisher</td>
<td></td>
<td></td>
<td>(Deprecated. Some operations may no longer work. Use the --role option instead.) Disallows publishing rights for users in the group.</td>
</tr>
<tr>
<td>--over-writesiterole</td>
<td></td>
<td></td>
<td>Allows a user’s site role to be overwritten with a</td>
</tr>
<tr>
<td>Option (short)</td>
<td>Option (long)</td>
<td>Argument</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>less privileged one when using <code>--role</code>. By default, a user site role can be promoted when using <code>--role</code>, but cannot be demoted. Because the <code>--overwritesiterole</code> option will demote user site roles, use it with caution.</td>
</tr>
<tr>
<td></td>
<td><code>--publisher</code></td>
<td></td>
<td>(Deprecated. Some operations may no longer work. Use the <code>--role</code> option instead.)</td>
</tr>
<tr>
<td></td>
<td><code>--role</code></td>
<td><code>ServerAdministrator, SiteAdministrator, Publisher, Interactor, Viewer, ViewerWithPublish, Viewer, UnlicensedWithPublish, or Unlicensed</code></td>
<td>Specifies a role for users in the group. The default is <code>Unlicensed</code>.</td>
</tr>
</tbody>
</table>

**Note:** If you specify a role option, you cannot also include license, publisher, no-publish,
<table>
<thead>
<tr>
<th>Option (short)</th>
<th>Option (long)</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Option (long)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>version</td>
<td></td>
<td></td>
<td>Displays the version information for the current installation of the tabcmd utility.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td></td>
<td>Example command:</td>
</tr>
<tr>
<td>tabcmd version</td>
<td></td>
<td></td>
<td>tabcmd version</td>
</tr>
</tbody>
</table>

**Server Administrator Reference**

**Tableau Server Processes**

Tableau Server installs a number of processes that work together to deliver the features that make up Tableau Server.

**In this topic**

- Configuring processes
- Licensed processes
- List of processes
Configuring processes

Certain processes listed below cannot be configured: cluster controller and coordination service are installed on every node as part of the base install. They are required on every server node and do not count against a core-based license. File store is installed when you install data engine and cannot be installed separately. Every instance of a data engine process will always have one instance of the file store process present as well.

The topics Performance Tuning Examples and High Availability describe some of the approaches you can take when configuring processes. High-level status for each process is displayed on the server’s Status page and more detailed information related to some of the processes—such as the background process—is in the Administrative Views topic.

Licensed processes

Some of the processes that are installed as a part of Tableau Server are "licensed" processes. Licensed processes need a valid Tableau Server license in order to run. Other processes that are installed as a part of Tableau Server are not tied to a valid license. This has the following impact:

- Every licensed process needs to regularly contact the Tableau Server License Manager service that runs on the primary Tableau Server computer to verify they are licensed. If they cannot confirm there is a valid license, for example, if the primary node is not available, the process will not run and Tableau Server may not function properly or reliably.

- If you have a core-based Tableau Server license, the cores on any node with a licensed processes will count against the total count of licensed cores.

The "Licensed" column in the table below identifies those processes that require a valid license, and which impact the count of cores in core-based licenses.

List of processes

For information on log files generated by these processes, see Server Log File Locations.
<table>
<thead>
<tr>
<th>Process</th>
<th>Purpose</th>
<th>Multi-Threaded</th>
<th>Performance Characteristics</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server</td>
<td>Handles the web application, REST API calls, supports browsing and searching</td>
<td>Yes</td>
<td>Only consumes noticeable resources during infrequent operations, like publishing a workbook with an extract, or generating a static image for a view. Its load can be created by browser-based interaction and by tabcmd.</td>
<td>Yes</td>
</tr>
<tr>
<td>vizportal.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backgrounder</td>
<td>executes server tasks, including extract refreshes, subscriptions, ‘Run Now’ tasks, and tasks initiated from tabcmd</td>
<td>No</td>
<td>A single-threaded process where multiple processes can be run on any or all machines in the cluster to expand capacity. The backgrounder normally doesn’t consume much process memory, but it can consume CPU, I/O, or network resources based on the nature of the workload presented to it. For example, performing large extract refreshes can use network bandwidth to retrieve data. CPU resources can be consumed by data retrieval or complex tabcmd tasks.</td>
<td>Yes</td>
</tr>
<tr>
<td>backgrounder.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cache Server</td>
<td>Query cache</td>
<td>No</td>
<td>A query cache distributed and shared across the server cluster. This in-memory cache speeds user experience across many scenarios. VizQL server, backgrounder, and data</td>
<td>No</td>
</tr>
<tr>
<td>redis-server.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threa-ded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>server (and API server and application server to a lesser extent) make cache requests to the cache server on behalf of users or jobs. The cache is single-threaded, so if you need better performance you should run additional instances of cache server.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster Controller</td>
<td>Responsible for monitoring various components, detecting failures, and executing failover when needed</td>
<td>n/a</td>
<td>Included in the base install on every node.</td>
<td>No</td>
</tr>
<tr>
<td>cluster-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>controller.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination Service</td>
<td>In distributed installations, responsible for ensuring there is a quorum for making</td>
<td>n/a</td>
<td>Always installed on the primary node. For server installations with three to five nodes, also installed on the first two worker nodes. For server installations of more than five nodes, also installed on the first four worker nodes.</td>
<td>No</td>
</tr>
<tr>
<td>zookeeper.exe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Data Engine</td>
<td>Stores data extracts and answers queries</td>
<td>Yes</td>
<td>The data engine’s workload is generated by requests from the VizQL server, application server, API server,</td>
<td>Yes</td>
</tr>
<tr>
<td>tdeserver64.exe</td>
<td></td>
<td></td>
<td>data server, and backgrounder server processes. The data engine services requests from most of the other</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>server processes as well. It is the component that loads extracts into memory and performs queries against</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>them. Memory consumption is primarily based on the size of the data extracts being loaded. The data</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>engine is multi-threaded to handle multiple requests at a time. Under high load it can consume CPU, I/O,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and network resources, all of which can be a performance bottleneck under load. At high load, a single</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>instance of the data engine can consume all CPU resources to process requests.</td>
<td></td>
</tr>
<tr>
<td>Data Server</td>
<td>Manages connections to Tableau</td>
<td>Yes</td>
<td>Because it’s a proxy, it’s normally only bound by network, but it can be bound by CPU with enough</td>
<td>Yes</td>
</tr>
<tr>
<td>dataserver.exe</td>
<td></td>
<td></td>
<td>simultaneous user sessions. Its load is generated by</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>File Store filestore.exe</td>
<td>Server data sources</td>
<td>n/a</td>
<td>browser- and Tableau Desktop-based interaction and extract refresh jobs for Tableau Server data sources.</td>
<td>No</td>
</tr>
<tr>
<td>File Store filestore.exe</td>
<td>Automatically replicates extracts across data engine nodes</td>
<td>n/a</td>
<td>Installed with data engine (cannot be installed separately). A file store process will always be present if there are one or more data engine processes installed.</td>
<td>No</td>
</tr>
<tr>
<td>Repository postgres.exe</td>
<td>Tableau Server database, stores workbook and user metadata</td>
<td>n/a</td>
<td>Normally consumes few resources. It can become a bottleneck in rare cases for very large deployments (thousands of users) while performing operations such as viewing all workbooks by user or changing permissions. For more information, see Tableau Server Repository.</td>
<td>No</td>
</tr>
<tr>
<td>Search &amp; Browse search-server.exe</td>
<td>Handles fast search, filter, retrieval, and display of content metadata on the server</td>
<td>Yes</td>
<td>The process is memory bound first, and I/O bound second. The amount of memory used scales with the amount of content (number of sites-/projects/workbooks/datasources/views/users) on the server.</td>
<td>No</td>
</tr>
<tr>
<td>Process</td>
<td>Purpose</td>
<td>Multi-Threaded</td>
<td>Performance Characteristics</td>
<td>Licensed</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>VizQL Server</td>
<td>Loads and renders views, computes and executes queries</td>
<td>Yes</td>
<td>Consumes noticeable resources during view loading and interactive use from a web browser. Can be CPU bound, I/O bound, or network bound. Process load can only be created by browser-based interaction. Can run out of process memory.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Tableau Server Ports

The following table lists the ports that Tableau Server uses by default, and which must be available for binding. If you install multiple instances of a process (Cache Server for example) on a node, consecutive ports are used, starting at the base port.

If Windows Firewall is enabled, Tableau Server will open the ports it needs for internal communication between processes. In some cases, if you are making an external connection to the Tableau Server database you may need to open ports manually. If have installed Tableau Server onto a Windows computer where Windows Firewall is disabled, then you will need to verify that the appropriate ports are open. In all cases, you should run Tableau Server on a computer where a firewall is enabled and configured to allow traffic only on ports specified in this topic.

#### Dynamic port remapping

When dynamic port remapping is enabled (the default), Tableau Server first attempts to bind to the default ports, or to user-configured ports if they are defined. If the ports are not available, Tableau Server attempts to remap most processes to other ports, starting at port 8000. When next restarted, Tableau Server will revert to using the default or configured ports.
The gateway port and SSL port are not dynamically remapped. If port 80 is not available when Tableau Server is first installed, the installation program will choose a different gateway port (usually 8000). This value will display on the General tab of the Configuration utility. Tableau Server will always use the port shown in the Configuration utility for the gateway process.

When dynamic port remapping is disabled, Tableau Server does not attempt to remap processes and if a conflict is detected, Tableau Server will not start.

**Note:** Port conflicts can affect how JMX ports are determined. For more information, see Enable the JMX Ports.

You can disable dynamic port remapping using the `tabadmin set service.port_remapping.enabled` command. For more information, see `tabadmin set options`.

<table>
<thead>
<tr>
<th>Port</th>
<th>TCP/U-DP</th>
<th>Used by ...</th>
<th>All</th>
<th>Distributed / High Availability</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>TCP</td>
<td>Gateway</td>
<td>X</td>
<td></td>
<td>gateway.public.port, workerX.gateway.port</td>
</tr>
<tr>
<td>443</td>
<td>TCP</td>
<td>SSL: When Tableau Server is configured for SSL, the application server redirects requests to this port.</td>
<td>X</td>
<td></td>
<td>Tableau Server only supports SSL on port 443.</td>
</tr>
<tr>
<td>Port</td>
<td>TCP/U-</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>2233</td>
<td>UDP</td>
<td>Server Resource Manager UDP port used for communication between Tableau Server processes. The Server Resource Manager monitors memory and CPU usage of Tableau Server processes (backgrounder.exe, dataserver.exe, tabprotosrv.exe, tdeserver.exe, vizportal.exe, vizqlserver.exe).</td>
<td>X</td>
<td>Distributed / High Availability</td>
<td>resource_manager_port</td>
</tr>
<tr>
<td>3729</td>
<td>TCP</td>
<td>Tableau Server setup</td>
<td>X</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>3730–3731</td>
<td>TCP</td>
<td>Tableau worker servers in distributed and</td>
<td>X</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/UDP</td>
<td>Used by …</td>
<td>TYPE OF INSTALLATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>------------</td>
<td>----------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>Distributed / High Availability</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>5000</td>
<td>UDP</td>
<td>Server Worker Manager process (tabadmwrk.exe) that is used for auto-discovery of worker servers in a distributed environment.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6379</td>
<td>TCP</td>
<td>Cache Server process (redis-server.exe). Base port 6379. Consecutive ports after 6379 are used, up to the number of processes.</td>
<td>X</td>
<td>workerX.cacheserver.port</td>
<td></td>
</tr>
<tr>
<td>8060</td>
<td>TCP</td>
<td>PostgreSQL</td>
<td>X</td>
<td>pgsql.port</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/UDP</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>-------------</td>
<td>----------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Distributed / High Availability</td>
<td></td>
</tr>
<tr>
<td>8061</td>
<td>TCP</td>
<td>PostgreSQL database. Used for verifying integrity of database for restoring.</td>
<td>X</td>
<td>pgsqIverify_restore.port</td>
<td></td>
</tr>
<tr>
<td>8062</td>
<td>TCP</td>
<td>PostgreSQL database</td>
<td>X</td>
<td>pgsqIX.port</td>
<td></td>
</tr>
<tr>
<td>8080</td>
<td>TCP</td>
<td>Solr, Tomcat HTTP, and Repository processes</td>
<td>X</td>
<td>solr.port, tomcat.http.port, repository.port These parameters must be set to the same value.</td>
<td></td>
</tr>
<tr>
<td>8085</td>
<td>TCP</td>
<td>Tomcat HTTP</td>
<td>X</td>
<td>tomcat.server.port</td>
<td></td>
</tr>
<tr>
<td>8250</td>
<td>TCP</td>
<td>Background tasks</td>
<td>X</td>
<td>workerX.backgrounder.port</td>
<td></td>
</tr>
<tr>
<td>8350</td>
<td>TCP</td>
<td>Background tasks</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8600</td>
<td>TCP</td>
<td>Application Server process (vizportal.exe)</td>
<td>X</td>
<td>workerX.vizportal.port</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/UDP</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All Distributed / High Availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8700</td>
<td>TCP</td>
<td>Base port 8600. Consecutive ports after 8600 are used, up to the number of processes.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8755</td>
<td>TCP</td>
<td>Application Server process (vizportal.exe)</td>
<td>X</td>
<td>tabadminservice.port</td>
<td></td>
</tr>
<tr>
<td>9100–9199</td>
<td>TCP</td>
<td>VizQL Server process (base port 9100). Consecutive ports after 9100, up to the number of processes, are also used. By default, Tableau Server installs with two VizQL Server processes (ports 9100 and 9101).</td>
<td>X</td>
<td>vizqlserver.port</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/UDP</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>9200, 9400</td>
<td>TCP</td>
<td>VizQL Server process</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9345</td>
<td>TCP</td>
<td>File Store service</td>
<td>X</td>
<td>filestore.port</td>
<td></td>
</tr>
<tr>
<td>9346</td>
<td>TCP</td>
<td>File Store status service</td>
<td>X</td>
<td>filestore.status.port</td>
<td></td>
</tr>
<tr>
<td>9700–9899</td>
<td>TCP</td>
<td>Data Server process (base port 9700). Consecutive ports after 9700, up to the number of processes, are also used. By default, Tableau Server installs with two Data Server processes (ports 9700 and 9701).</td>
<td>X</td>
<td>dataserver.port</td>
<td></td>
</tr>
<tr>
<td>9800, 10000</td>
<td>TCP</td>
<td>Data Server process</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11000</td>
<td>TCP</td>
<td>Search server</td>
<td>X</td>
<td>workerX.searchserver.port</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/U-DP</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>-------------------------------------------------</td>
<td>-----------------------</td>
<td>------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>11100</td>
<td>TCP</td>
<td>Search server</td>
<td>All</td>
<td>X workerX.search-server.startup.port</td>
<td></td>
</tr>
<tr>
<td>12000</td>
<td>TCP</td>
<td>Coordination controller (ZooKeeper) client port</td>
<td>X</td>
<td>workerX.zookeeper.port</td>
<td></td>
</tr>
<tr>
<td>12012</td>
<td>TCP</td>
<td>Cluster Controller process</td>
<td>All</td>
<td>X cluster.status.port</td>
<td></td>
</tr>
<tr>
<td>12013</td>
<td>TCP</td>
<td>Cluster Controller process</td>
<td>All</td>
<td>X cluster.storage.port</td>
<td></td>
</tr>
<tr>
<td>13000</td>
<td>TCP</td>
<td>Coordination controller (ZooKeeper) leader port</td>
<td>All</td>
<td>X zookeeper.config.leaderPort</td>
<td></td>
</tr>
<tr>
<td>14000</td>
<td>TCP</td>
<td>Coordination controller (ZooKeeper) leader election port</td>
<td>All</td>
<td>X zookeeper.config.leaderElectPort</td>
<td></td>
</tr>
<tr>
<td>2700-0</td>
<td>TCP</td>
<td>Workers and primary server to communicate licensing information</td>
<td>All</td>
<td>X --</td>
<td></td>
</tr>
<tr>
<td>Port</td>
<td>TCP/UDP</td>
<td>Used by ...</td>
<td>TYPE OF INSTALLATION</td>
<td>Parameter</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distributed / High Availability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Port**
- **TCP/UDP**
- **Used by ...**
- **TYPE OF INSTALLATION**
- **Parameter**

<table>
<thead>
<tr>
<th>Port</th>
<th>TCP</th>
<th>Used by ...</th>
<th>TYPE OF INSTALLATION</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One additional port is dynamically chosen for workers and the primary server to communicate licensing information in distributed and highly available environments.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>27042</td>
<td>TCP</td>
<td>Data Engine process. Tableau Server installs with one Data Engine process. There can be up to two Data Engine processes per node.</td>
<td></td>
<td>dataengine.port</td>
</tr>
</tbody>
</table>
Edit the Default Ports

Tableau Server processes are configured to use certain ports on the computer where the server is installed. For more information, see Tableau Server Ports.

In general, you do not need to make changes to the port assignments for the server processes. However, if the computer that's running Tableau Server is also running other software that uses ports (this is not recommended), it's possible that the port assignments for Tableau Server processes conflict with ports used by the other software. In that case, you can assign different ports to Tableau Server processes.

To modify the ports used by Tableau Server processes, you use the command line administrative tool (tabadmin). For example, the default port for the application server process (vizportal.exe) is 8000. You can use the tabadmin parameter workerX.vizportal.port to change it to a different port.

**Note:** Changing ports requires a restart of Tableau Server. While the server is restarting it will be unavailable to all users. Be sure to warn your users of the outage prior to this operation or schedule this maintenance during non-business hours.

Follow the steps below to change the Tableau Server port configuration. If you are enabling the server’s JMX ports, see Enable the JMX Ports

1. Open a command prompt as an administrator and type the following:

   ```
   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"
   ```

2. Modify a port value by typing one of the following commands:

   ```
   tabadmin set <workerX>.<parameter> <new port value>
   tabadmin set <parameter> <new port value>
   ```

   where:
• `<workerX>` indicates which machine in a cluster you want to change the process port for. The placeholder `X` refers to the worker number—worker0 is the primary server (or the only server if you are not running a distributed server), worker1 is the first worker server, worker2 is the second worker server, and so on. If you are running a distributed server and you want to change the default port for a process on all machines in the cluster, you need to run the command (from a command prompt on the primary) once for each machine in the cluster.

• `<parameter>` is the server process that you are setting the port for, such as `vizportal.port`.

• `<new port value>` is the new port number you want the server process to use.

Here’s an example that sets the port on the primary or standalone server to 8020 for the application server process (`vizportal`):

```bash
tabadmin set worker0.vizportal.port 8020
```

The following example sets the port for a 3-machine cluster (one primary and two workers) to 9200 for the VizQL server process.

```bash
tabadmin set worker0.vizqlserver.port 9200
tabadmin set worker1.vizqlserver.port 9200
tabadmin set worker2.vizqlserver.port 9200
```

You can use the following parameters to modify the corresponding ports—see Tableau Server Ports for a complete list of `tabadmin` parameters that can be set.

<table>
<thead>
<tr>
<th>Port to Change</th>
<th>Parameter</th>
<th>Multiple workers?</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>gateway.public.port</td>
<td>No</td>
</tr>
<tr>
<td>80</td>
<td>workerX.gateway.port</td>
<td>Yes</td>
</tr>
<tr>
<td>Port to Change</td>
<td>Parameter</td>
<td>Multiple workers?</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>6379</td>
<td>workerX.cacheserver.port</td>
<td>Yes</td>
</tr>
<tr>
<td>8060</td>
<td>pgsql.port</td>
<td>Yes</td>
</tr>
<tr>
<td>8600</td>
<td>vizportal.port</td>
<td>Yes</td>
</tr>
<tr>
<td>9100</td>
<td>vizqlserver.port</td>
<td>Yes</td>
</tr>
<tr>
<td>9345</td>
<td>filestore.port</td>
<td>Yes</td>
</tr>
<tr>
<td>9700</td>
<td>workerX.dataserver.port</td>
<td>Yes</td>
</tr>
<tr>
<td>11000</td>
<td>workerX.searchserver.port</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Note:** You should not change port assignments for processes that are not listed in this table. Changing other ports can cause Tableau Server to stop working.

3. After you make the necessary port configuration changes, restart Tableau Server by typing the following:

   tabadmin restart

**Enable the JMX Ports**

To help you work through a problem with Tableau Server, Tableau Support may ask you to enable the server’s JMX ports. These ports can be useful for monitoring and troubleshooting, usually with a tool like JConsole.

To enable the JMX ports on Tableau Server:

1. **Stop the server.**

2. Enter the following command:
tabadmin set service.jmx_enabled true

3. Enter the configure command:

    tabadmin configure

4. Start the server.

**Important** Enabling JMX ports can introduce some security risk. To mitigate this risk, it is important to limit access to the JMX ports to the fewest number of clients that's practical for your scenario. You typically limit access using the host's firewall rules, an external security device, or routing rules.

**JMX Port List**

Here's the list of JMX ports, all of which are disabled by default. When these ports are enabled, they are used for all types of installations: single-server, distributed, and highly available:

<table>
<thead>
<tr>
<th>Port</th>
<th>Used by this server process ...</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8300 - 8359</td>
<td>Application server JMX. Determined by the application server port(s) + 300.</td>
<td>--</td>
</tr>
<tr>
<td>8550</td>
<td>Background monitor JMX. Determined by the background port of 8250 + 300.</td>
<td>--</td>
</tr>
<tr>
<td>9095</td>
<td>Service monitor JMX.</td>
<td>svcmonitor.jmx.port</td>
</tr>
<tr>
<td>9400 - 9499</td>
<td>VizQL server JMX. Determined by the VizQL server port(s) + 300.</td>
<td>--</td>
</tr>
<tr>
<td>10000 - 10299</td>
<td>Data server JMX. Determined by the data server port(s) + 300.</td>
<td>--</td>
</tr>
</tbody>
</table>
How the JMX Ports Are Determined

By default, the JMX ports for the application server (8300 - 8359), backgrounder (8550), VizQL server (9400 - 9599), and the data server (10000 - 10299) are assigned using the formula "base port + 300". (See Tableau Server Ports for a list of the default base ports.) In addition, if there are multiple instances of a process, each will have a JMX port. For example, if you configure Tableau Server to run four instances of the application server process, ports 8000 (default base port), 8001, 8002, and 8003 are used. Application server JMX ports 8300 (base port + 300), 8301, 8302, and 8303 are then bound to their respective process instances.

If dynamic port remapping is enabled (which is the default) and if a port conflict is detected, JMX ports are not determined using the "base port + 300" formula. Instead, both base ports and JMX ports are assigned to available ports starting at port 8000. No offset is used for JMX ports; they are assigned the next available port, just like base ports are. If it's important that you have a fixed JMX port, you can disable port remapping or change the base ports so that there are no port conflicts.

Even though they’re not directly used by Tableau Server, if a JMX port is being used by another application, Tableau Server processes won’t run. In addition, JMX ports cannot be edited directly using tabadmin. You change a JMX port by changing the base port for its process. In other words, if port 10000 isn't available for the data server JMX process, you use tabadmin (as described in Edit the Default Ports) to change the data server base port from 9700 to 9800. This will move the data server JMX port to 10100.

Restore the Default Value for a Port

You can restore the default value for a port by following the procedure below:

1. Open a command prompt as an administrator and type the following:

   cd "C:\Program Files\Tableau\Tableau Server\10.2\bin"

2. Restore the default port value by typing the following:

   tabadmin set <workerX>.<parameter> --default
If Tableau Server is running on one machine, <workerX> is worker0. If you’re running a cluster, worker0 is the primary, worker1 is your first worker server, worker2 is your second, and so on.

Here’s an example:

tabadmin set worker0.vizqlserver.port --default

3. Update the server’s configuration by typing the following:

   tabadmin config

4. Restart Tableau Server by typing the following:

   tabadmin restart

User Management in Active Directory Deployments

This topic describes important technical details that you should be familiar with if you use Active Directory to authenticate users for Tableau Server.

**Note:** This topic assumes that you are familiar with Active Directory user management and basic Active Directory schema and domain concepts.

Active Directory user authentication and Tableau Server

Tableau Server stores all user names in the Tableau Server identity store, which is managed by the Tableau Server Repository. If Tableau Server is configured to use Active Directory for authentication, you must first import user identities from Active Directory to the identity store. When users sign in to Tableau Server, their credentials are passed to Active Directory, which is responsible for authenticating the user; Tableau Server does not perform this authentication. (By default, NTLM is used for authentication, but you can enable Kerberos or SAML for single sign-on functionality—however, in all these cases, authentication is left to Active Directory.) However, the Tableau user names stored in the identity store are associated with rights and permissions for Tableau Server. Therefore, after authentication is verified, Tableau Server manages user access (authorization) for Tableau resources.
Active Directory user name attributes and Tableau Server

Active Directory uniquely identifies user objects using several attributes. (For details, see User Naming Attributes on the MSDN website.) Tableau Server relies on two Active Directory user naming attributes:

- `sAMAccountName`. This attribute specifies the logon name that was originally designed for use with older versions of Windows In many organizations, this name is combined with the NetBIOS name for authentication, using a format like `example\jsmith`, where `example` is the NetBIOS name and `jsmith` is the `sAMAccountName` value. Due to the original design in Windows, the `sAMAccountName` value must be less than 20 characters.

  In the Windows Active Directory Users and Computers administrative console, this value is in the field labeled User logon name (pre-Windows 2000) on the Account tab of the user object.

- `userPrincipalName` (UPN). This attribute specifies a user name in the format `jsmith@example.com`, where `jsmith` is the UPN prefix and `@example.com` is the UPN suffix.

  In the Windows Active Directory Users and Computers administrative console, the UPN is a concatenation of two fields on the Account tab of the user object: the User logon name field, and the domain drop-down list next to it.

Adding users from Active Directory

You can add users individually from Active Directory, either by typing them in the server environment or by creating a CSV file and importing the users. You can also add Active Directory users by creating a group via Active Directory and importing all of the group’s users. The result can be different depending on which approach you’re using.

Adding users individually

In most case, Tableau Server uses the `sAMAccountName` value for the user name. When you import users individually from Active Directory (either by typing in their names or by
using a CSV file), Tableau queries Active Directory with the user name that you provide. If a match is found, then that name is imported into Tableau Server and it becomes the name that the user enters in order to sign in to Tableau Server.

The user name that Tableau Server will import into the identity store will be the sAMAccountName value unless one of the following is true:

- If the user name that you specify is longer than 20 characters.
- If the user name that you specify contains an @ character.

If the user name you enter meets either of these conditions, then Tableau will import the UPN prefix of the userPrincipalName attribute, which will become the user's Tableau logon user name.

If user names were inadvertently imported using UPN names, you can delete the accounts in Tableau Server and then reimport those accounts using the sAMAccountName value for the user name, as shown in User logon name (pre-Windows 2000) in the Windows Active Directory Users and Computers administrative console.

Adding user groups

If you import an Active Directory user group, Tableau will import all users from the group using the sAMAccountName.

Sync behavior when removing users from Active Directory

Users cannot be automatically removed from Tableau Server through an Active Directory sync operation. Users that are disabled, deleted, or removed from groups in Active Directory remain on Tableau Server so that you can audit and reassign the user's content before removing the user's account completely.

However, Tableau Server will act upon user objects differently based on how the status of that user object changes in Active Directory. There are two scenarios: deleting/disabling users in Active Directory or removing users from synchronized groups in Active Directory.
When you delete or disable a user in Active Directory and then synchronize that user's group on Tableau Server, the following occurs:

- The user is removed from the Tableau Server group you synchronized.
- The user’s role is set to "unlicensed."
- The user will still belong to the All Users group.
- The user is unable to sign in to Tableau Server.

When you remove a user from a group in Active Directory and then synchronize that group on Tableau Server, the following occurs:

- The user is removed from the Tableau Server group you synchronized.
- The user’s role is retained: it is not set to “unlicensed.”
- The user will still belong to the All Users group.
- The user will still have permission to the Tableau Server with access to everything that the All Users group is granted permission to use.

In both instances, to remove a user from Tableau Server, the server administrator must delete the user from the Server Users page in Tableau Server.

**Domain nicknames**

In Tableau Server, domain nickname is equivalent to the Windows NetBIOS domain name. In a Windows Active Directory forest, a fully qualified domain name (FQDN) can have an arbitrary NetBIOS name. The NetBIOS name is used as the domain identifier when a user logs in to Active Directory.

For example, the FQDN `west-na.corp.lan` might be configured with a NetBIOS name (nickname) of `SEATTLE`. The user `j.smith` in that domain could log on to Windows using either of the following user names:

- `west-na.corp.example.com\j.smith`
- `SEATTLE\j.smith`

If you want your users to sign in to Tableau Server with a NetBIOS name instead of the FQDN, then you'll need to verify that the nickname value for each domain where users log in is set. See `editdomain` for information on how to view and set the nickname value for each domain.
Support for multiple domains

You can add users from a domain that's different from the domain of the Tableau Server computer in these cases:

- Two-way trust has been established between the server’s domain and the users' domain.
- The server’s domain trusts the users’ domain (one-way trust). See Domain Trust Requirements.

The first time you add a user from the non-server domain, use the fully-qualified domain name with the user name. Any additional users you add from that domain can be added using the domain’s nickname, provided the nickname matches the NetBIOS name.

Duplicate display names

If user display names are not unique across multiple domains, then managing users with the same display name in Tableau can be confusing. Tableau Server will display the same name for two users. For example, consider an organization with two domains, example.lan and example2.lan. If user John Smith exists in both domains, then adding that user to groups and other administrative tasks will be confusing in Tableau Server. In this scenario, consider updating the display name in Active Directory for one of the users to differentiate the accounts.

Sign in to Tableau Server with NetBIOS name

Users can sign in to Tableau Server using the domain nickname (NetBIOS name), for example, SEATTLE\jsmith.

Tableau Server cannot query for NetBIOS name for a given FQDN. As a result, Tableau sets the nickname of a given FQDN according to the first entry in the namespace. For example, given the FQDN west.na.corp.lan, Tableau sets the nickname to west.

Therefore, you might need to update the domain nickname on Tableau Server before users can sign in using the nickname. If you do not update the nickname, users will have to sign in
using a fully qualified domain name. For more information, see Users From New Domain Unable to Log In and Do Not Appear in User List in the Tableau Knowledge Base.