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Get Started

Tableau Online is a secure, cloud-based solution for authoring, sharing, distributing, and collaborating on content created in Tableau.

What’s New in Tableau Online

Tableau Online is now Tableau Cloud. We will continue to refer to Tableau Online for the next few months until the name change is complete.

This topic contains an overview of some of the key new features added in Tableau Online.

Tableau Online Release Notes | Known Issues

Web authoring and interacting with views

For new features and enhancements related to web authoring and interacting with views, see What's New in Tableau Desktop and Web Authoring. For more topics related to those tasks, see Using Tableau on the Web.

What's new in August 2022

MFA enforcement for site admins and all new sites

In compliance with Tableau Online's multi-factor authentication (MFA) requirements, beginning in August 2022, MFA is enabled for site admins on all existing Tableau Online sites and all roles for new Tableau Online sites.

For more information about MFA, see one of the following:

- For site admins, see Multi-Factor Authentication and Tableau Online
- For users, see Register for multi-factor authentication
- Salesforce's Multi-Factor Authentication (MFA) Enforcement Roadmap
Copy values from the Tableau Prep data grid

Starting in August in Tableau Online you can now copy a selected set of values from the data grid in Tableau Prep and paste them into any document. For example, Microsoft Excel, a CSV file, an email to a co-worker to tell them to update their source data, even your SQL editor to make running your queries easier than ever.

For more information, see Copy field values in the data grid in the Tableau Prep help.

What's new in June 2022

Provision users and groups with Azure Active Directory

Site administrators can now automate user management, provision groups, and assign Tableau Online site roles through Azure Active Directory. For more information, see Configure SCIM with Azure Active Directory.

Authorize access to Tableau REST API using Tableau connected apps

Using connected apps, you can programatically authorize access to the REST API on users’ behalf using JSON web tokens (JWTs).

For more information, see Access Scopes for Connected Apps.

Enable Explain Data by default per site

Site admins can enable Explain Data by default using site settings and the Explain Data permission. Authors no longer need to set the workbook option Allow Explain Data to be used in this workbook when viewed online in the Explain Data Settings dialog box (the workbook setting has been removed). Access to Explain Data in viewing mode is based on site setting, site role, and the Explain Data permission.

For more information, see Control Access to Explain Data.
Adjust the comparison and date range for metrics

You can now edit a metric's configuration to change the comparison, date range, and status indicator. Previously, you could only configure these options when you created a metric. For more information, see Edit a metric's configuration.

Add a Tableau Data Story to your dashboard

You can now create a Data Story in Tableau Online and in English only. Data Stories automatically generates narrative insights within your dashboard, saving time and surfacing relevant insights. As you interact with your dashboard, the stories written by Data Stories adjust allowing you to dive deeper into data and identify key insights faster. For more information, see Create a Tableau Data Story (English Only).

Edit published data sources

As of June, you can now edit more types of connections, including Amazon Athena, OData, Databricks, and SharePoint lists. For more information, see Edit a Published Data Source.

Suspend accelerated views automatically

You can now automatically suspend acceleration for views that are consuming unnecessary resources. Set a threshold for the number of times an acceleration task can fail per day, week, or month before the acceleration is automatically suspended. For more information, see View Acceleration.

Understand the ICU 68.2 upgrade

For improved security and better language support, we’re upgrading to the current International Components for Unicode (ICU) library, 68.2. This update resolves issues with ordering and better handles new Unicode characters. This update can impact dashboard sorting, filtering, and calculations. If you use string comparisons in calculated fields, confirm that your calculations are still working as expected. For more information, see String Functions.
Tableau Catalog - part of Data Management

**Ask Data Lenses appear in lineage** - The lineage pane now contains lens information. For more information, see Use Lineage for Impact Analysis.

Virtual connections - part of Data Management

**Virtual connections support revision history** - Revision history lets you view the changes to the connection, delete a revision, or restore the connection to a previous version.

**Enhanced filter features for data policy testing** - In the virtual connection editor, when you preview the data with your data policy applied, you can now see the values that are allowed by the policy and the values that are filtered out.

Tableau Bridge support for OAuth

Tableau Bridge now supports OAuth as an authentication method for connections to: Snowflake, Google BigQuery, Google Drive, Salesforce, and OneDrive. Using OAuth provides better security than basic username and password authentication and is easier to manage. For more information, see Publish OAuth enabled private cloud-based data sources.

Features Introduced in Previous Versions of Tableau Online

Browse summaries of features for previously released versions.

All Tableau Online Release Notes | All Known Issues

Added in previous versions

Added in May 2022

Admin Insights Job Performance data source
Get more visibility into your site with Admin Insights. You can now connect to the Job Performance data source to see events and runtime information for background jobs on the site. Jobs include extracts refreshes, Bridge refreshes, and flow runs. For more information, see Use Admin Insights to Create Custom Views.

**Added in March 2022**

**IPv4 address support for Bridge pools**

When mapping domains to Bridge pools, site admins can specify IPv4 addresses in the Private Network allowlist to refresh data sources and virtual connections that use IPv4 addresses in their connections. For more information, see IP addresses.

**Accelerate load time for your view**

Workbook owners, site administrators, and server administrators can now accelerate load time for their views. View Acceleration precomputes long-running queries, so accelerated workbooks load faster. For more information, see View Acceleration.
Customize the View Data window

In a worksheet, you can customize the tabular display of your data in the View Data window. Remove columns from the default view, change the column order, sort columns, or add columns to provide deeper context. You can then download the customized view of the underlying data as a CSV file to share with your team.

**Note:** When you customize the View Data window, the changes remain only while the View Data window is open.

The new View Data window and customization options are available in Tableau Online, Tableau Server, and Tableau Desktop. For more information, see [View Underlying Data](#).

The View Data window and its options are accessible for keyboard navigation and screen readers in Tableau Online, Tableau Server, and Tableau Desktop. For more information, see [View Data Window](#) in "Keyboard Accessibility for Tableau".

Open the Sheet Description for a workbook on the web

Sheet Description is now available in Tableau Online and Tableau Server. While editing a workbook on the web, in the Worksheet menu, select **Sheet Description**. Field descriptions are also available on the web. For more information, see [Get Details About Fields and Sheets in a Workbook](#).

Change to Search behavior in Tableau

Beginning with the 2022 Spring release, the Search functionality on the Search Results page in Tableau has changed. Prior to this release, content was indexed to allow “partial token matching.” This meant that you could search for a partial string. For example, if you searched for “super” the results could include content that contained the word “Superstore” in the title, description or columns, even if the word “super” was not present by itself.

As of Spring 2022, indexing is done in a new way that supports both “full token matching” and “fuzzy token matching.” This means that the results you see will be based on complete
strings, and will not do partial matches. Fuzzy matching provides partial matching on complete strings. To find “Superstore”, you need to search for “superstore” or some variation of that entire string, for example “supertor”, “sperstore”, or “superstores”. Searching on just “super” will not return that match. The goal and benefit of this approach is to reduce noise, limiting the results to content that more closely matches your search string.

Recommendations for taking advantage of this change:

- Use complete words in your query
- Search for words that are present in the title or description of the content

Quick Search

The behavior of Quick Search has not changed, so partial token matching is still supported, but this means that the results in Quick Search will likely not be the same as the results in the Search Results page.

Tableau Catalog - part of the Data Management Add-on

**Certifications and data quality warnings for virtual connections** - You can now certify and set data quality warnings on virtual connections.

**Virtual connections appear in lineage** - The lineage pane now contains both virtual connection and virtual connection table information. For more information, see Use Lineage for Impact Analysis.

Developer Resources

**Virtual connections in the Metadata API** - Virtual connections and virtual connection tables are now addressable using the Metadata API, and can appear in output when using it. For more information, see Understand the Metadata Model in the Tableau Metadata API Reference.

Virtual connections - part of the Data Management Add-on

**Salesforce connector supports virtual connections** - You can connect Tableau to your Salesforce data and create virtual connections and data policies that implement row-level
security. See About Virtual Connections and Data Policies for details about virtual connections.

**Virtual connections added to space usage view** - Virtual connections are added as an Object Type in the Stats for Space Usage view so administrators can see how much disk space virtual connections use.

### Added in January 2022

**Set up OAuth for Salesforce CDP**

As a Tableau Online site admin, you can set up OAuth for Salesforce CDP. For more information, see Set Up OAuth for Salesforce CDP.

**Update Admin Insights data sources**

As a Tableau Online site admin, you can now specify how often Admin Insights data sources are updated on your site. For more information, see Manage Admin Insights.

**Tableau Online sign-in updates**

For users added to multiple Tableau Online sites, the sign-in process will now prompt users to enter the site URI of the site they are attempting to access. For more information, see Sign In to Tableau Online.

**Get view load times with Admin Insights**

Get more visibility into your Tableau Online site with a new Admin Insights data source. You can now connect to Viz Load Times to see load time information for views published on your site. For more information, see Use Admin Insights to Create Custom Views.

### Added in December 2021

**Reset MFA verification methods**

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Tableau Online Help
Site admins can now reset MFA for users who lose all their usual MFA verification methods and are locked out of the site. For more information, see Multi-Factor Authentication and Tableau Online.

Support for IdP-initiated SLO

In addition to supporting service provider (SP)-initiated single log out (SLO), Tableau Online supports identity provider (IdP)-initiated SLO. For more information about SAML configuration and requirements, see SAML Requirements for Tableau Online.

Use Tableau connected apps to enable SSO for embedded content

In early January 2022, as a site admin, you can use Tableau connected apps to create and manage explicit trust relationships between your Tableau Online site and custom applications where Tableau content is embedded. With connected apps, you can restrict which content can be embedded and where the content can be embedded, and provide users the ability to access embedded content using single sign on (SSO) without having to integrate with an identity provider (IdP). For more information, see Configure Tableau Connected Apps to Enable SSO for Embedded Content.

Keep more data fresh across multiple private networks

Site admins can now configure multiple Bridge pools to load balance data freshness tasks. Pools can be mapped to domains, giving you the ability to dedicate pools to keeping specific data fresh and maintain security by restricting access to protected domains in your private network. For more information, see Configure the Bridge Client Pool.

Schedule and manage refreshes for file-based data sources directly in Tableau Online

Beginning with Bridge version 2021.4.3, refreshes for file-based data sources using Bridge will be integrated with Online schedules. Publishers can schedule and manage refresh schedules for file-based data sources directly from Tableau Online. For more information, see Set Up a Bridge Refresh Schedule.
Note: Your site admin must have at least one Bridge 2021.4.3 client in a pool mapped to the domain where your file-based data sources are located.

Data freshness support for virtual connections

Keep new virtual connections that connect to private network data fresh using Bridge. The Data Management Add-on must be enabled for your site to create and use virtual connections. For more information about virtual connections, see About Virtual Connections and Data Policies.

Edit published data sources

In Tableau Online, you can now edit published data sources. Previously, only data sources embedded in workbooks could be edited.

Whether you’re creating a new published data source or editing an existing published data source, you can create joins and edit the schema from the Data Source page. Then use the Scratchpad to test your changes, create folders, organize hierarchies, and rename fields and aliases before publishing your data source—all without ever leaving Tableau. For more information, see Edit a Published Data Source.

Copy and paste dashboard objects

You can now copy and paste objects either within the current dashboard, or from dashboards in other sheets and files. Note that you can’t, however, copy sheets in a dashboard, items that rely on a specific sheet (such as filters), or objects on a device layout. For the complete list of unsupported items and detailed instructions, see Copy objects.
Replay animations in dashboards, stories, and worksheets

You can now replay animations in dashboards, stories, and worksheets wherever you use Tableau. Click the Replay button to rewind and replay the most recent animation. You can also choose the speed at which you want to replay the animation: actual speed, 2x speed, or 1/2 speed. Animations help you see how your data is changing in context, so you can make better conclusions about your data. For more information, see Format Animations.
Share Ask Data vizzes with Slack

If your Tableau administrator has configured Slack integration, you can quickly share Ask Data vizzes with anyone who has access to a lens. In the upper right corner of the browser, click the Share icon, then enter specific user names in the text box.

For more information, see Share Ask Data vizzes via email, Slack, or a link.

Use terms previously reserved for analytical functions in Ask Data

Previously, analytical terms found in data source field names and values were ignored by Ask Data. But now it treats terms like "average," "group," "filter," "limit," "sort," and "date" just like any other form of data, letting you analyze data sources without needing to revise their contents.

Query fields with table calculations in Ask Data

Ask Data now lets you query fields with table calculations. Be aware that you cannot include filters, limits, or "year over year difference" comparisons in your query expressions for these
calculations.

Add Ask Data lenses to Favorites

You can now add Ask Data lenses to your Favorites list for a site, helping you easily return to them.

Provide feedback to Ask Data lens authors

If you have questions about the structure of a lens or how best to use it with Ask Data, you can send feedback directly to the author.

To the left of the query box for Ask Data, click the "i" icon.

Then, at the bottom of the tips dialog, click **Contact the Lens Author**.

This option is enabled by default, but lens authors can hide it by following the steps in Let users email you questions about a lens.

Rename fields and tables when authoring Ask Data lenses

If field and table names in a data source don't reflect terms your users would recognize, lens authors can now rename these items for each lens.

At left, hover over individual tables or fields, and click the pencil icon:
Then provide a more representative name by clicking the pencil icon to the right.

For more information, see Create or configure a lens page on your Tableau site.

Identify outliers with Data Change Radar (limited preview)

Data Change Radar is available as a limited preview. If you’re a Tableau administrator who would like your organization to join the preview, sign up here.

Data Change Radar shows data that falls outside of expected ranges, revealing changes you may want to explore further. An overview of the process appears here; for details about which views are tracked and how you can interact with them, see Identify Outliers with Data Change Radar (Limited Preview).

In Tableau Online and Tableau Server, you’ll see recommended data changes with this icon on the Home page and the Recommendations page. Click the thumbnail of a recommended view to open it and access Data Change Radar.
When the view appears, the Data Change Radar pane opens at right showing a list of unexpected changes. In the list, hover over each change to highlight the related mark in the view.

Click a change in the list to see how the measure values have changed over time. When the graph appears, you can drag over it to see specific values captured at each time point.
Embed metrics into webpages

Include metrics on the webpages and apps where they are relevant by embedding them. To embed a metric, copy the embed code provided on your Tableau site or write your own embed code. An embedded metric follows the same sign in and permission restrictions as the site the metric is embedded from on Tableau Online or Tableau Server, so your metric's data is secure. For more information, see Embed Metrics into Webpages.
Tableau Online Help

Configure new comparisons and statuses for metrics

When you create a metric, you can now adjust the date range, configure the historical comparison, and set status indicators. The comparison and status you set are displayed on the metric card, giving users an easy to understand indicator of how the metric is performing compared to a prior point in time or a specific value you’ve defined. For more information see, Create and Troubleshoot Metrics.

Salesforce Admin Insights and Nonprofit Cloud

After connecting to Salesforce, you can now publish additional workbooks and data sources for Salesforce Admin Insights and Nonprofit Cloud. The content is customized for your organization and allows you to explore your Salesforce data in Tableau Online. For more information, see Create Workbooks with Salesforce Data.

Add-ons

Virtual connections and data policies - part of the Data Management Add-on

Virtual connections and data policies are included in the separately licensed Data Management Add-on for Tableau Online. These new data management features enable you to provide a single, centralized connection to a database for your users, as well as define row-level security on the tables in the connection using a data policy. For more information, see About Virtual Connections and Data Policies.
With virtual connections you get Quick Help

As you create and test your new virtual connection, help is just a click away. Delivered in the product, Quick Help shows relevant just-in-time help content based on where you are or what you’re doing in the virtual connection editor. Simply click the ? icon on the top right of your screen to open the movable help window.

Tableau Catalog - part of the Data Management Add-on

**Custom SQL information on content lineage pages** - Catalog lineage pages show information that helps users understand more about custom SQL in their content.

- A banner on lineage pages identifies content that uses custom SQL.
- You can review the custom SQL query.
- A warning is shown for custom SQL queries that could result in incomplete lineage.

For more information, see [Supported lineage](#) in the Tableau Desktop and Web Authoring Help.

**Tableau Catalog supports the T-SQL dialect in custom SQL queries** - Support for the T-SQL dialect means Tableau Catalog can provide more complete lineage when
custom SQL is used. For more information, see Supported queries in the Tableau Desktop and Web Authoring Help.

Data quality warnings links in email automatically open the Data Details pane - When you click a data quality warning in a subscription email, the view opens with the Data Details pane shown. Also, a new embed parameter, showDataDetails, is available to open the view with the Data Details pane shown. For more information, see Parameters for Embed Code in the Tableau Desktop and Web Authoring Help.

Inherited descriptions appear in the fields list on lineage pages - When a description for a field exists upstream from the field, it now appears in the fields list on lineage pages with information about where the description is inherited from. For more information, see How field descriptions are inherited in the Tableau Desktop and Web Authoring Help.

Easily create Prep flows based on external assets - Now you can use databases and tables as starting points for new flows in Prep web authoring. For more information, see Start a new flow in the Tableau Prep Help.

Added in September 2021

Share, collaborate, and keep up with your data in Slack

You can now see Tableau notifications in Slack with the Tableau for Slack app, which lets Tableau Online site administrators connect with a Slack workspace. Once connected, licensed Tableau users can receive notifications in Slack when they’re mentioned in a comment, when teammates share content with them, or when data meets a specified threshold in a data-driven alert. For more information, see Integrate Tableau with a Slack workspace.

Save workbooks in Personal Space

Creators and Explorers can now edit and save content to Personal Space, a private location for each web author on a Tableau site. Content saved to Personal Space is private to the user and controlled by added resource governance. In Settings, you can enable Personal
Space and set user storage limits. Administrators can continue to access and manage all content, including Personal Space content. For more information, see Create and Edit Private Content in Personal Space.

Set your workbook data freshness policy

Strike a balance between performance and data freshness by using workbook data freshness policies. While cached data is great for the performance of live-connection workbooks, seeing stale cached data in a viz can cause confusion and frustration for workbook users. Now with data freshness policies, workbook owners or administrators can choose granular data freshness policies, so the freshest data appears when your business needs it.

From the Workbook Details dialog in Tableau Online or Tableau Server, choose **Edit Data Freshness Policy**. Then, choose one of the following:

- **Site default** (12 hours in Tableau Online)
- **Always live** (Tableau will always get the latest data.)
- **Ensure data is fresh every**...then, set your interval, such as every 12 hours.
- **Ensure data is fresh at**...then set your days and times, such as Monday, Wednesday, and Friday. at 09:00 AM Pacific time.

Data freshness policies allow you to optimize workbook performance on a schedule that meets the needs of your business. For more information, see Set a Data Freshness Policy.
Rename published data sources

In Tableau Online and Tableau Server, you can now rename a published data source for which you have Save permissions. To rename a published data source, click the More actions menu, and choose Rename—just like renaming workbooks. You can also rename a published data source using the Update Data Source REST API. When a published data source is renamed, all workbooks that use that data source will use the new name after the next data source refresh is complete. For more information, see Best Practices for Published Data Sources.
Use axes animations to see and understand changes in scale

Axes animations are now available in Tableau Desktop, Tableau Online, and Tableau Server. For example, when you filter your viz to include a new data group, you’ll see that the scale of the axis changes because a new value was added. Axes animations allow you to see changes of scale in context so you can make better conclusions about your data. For more information, see Format Animations.

Use advanced filtering

From wherever you use Tableau, you can now use advanced filtering that was previously available only in Tableau Desktop. Use Wildcard filtering to filter for strings that match your filter criteria. Or, author Formulas that work with Conditions or Top N filters. For more information, see Filter categorical data (dimensions).
Set new permission capability for metrics

The Create/Refresh Metrics permission capability has been added for workbooks. For more information, see Permission Capabilities and Templates in the Permissions topic.

Prior to 2021.3, the Create/Refresh Metrics capability was controlled by the Download Full Data capability. On workbooks created prior to 2021.3, users who had the Download Full Data capability will have the Create/Refresh Metrics capability.

This new capability provides finer-grained control over your data, allowing you to grant users the ability to create metrics while denying the ability to view or download the full data for the view.

Control access to Explain Data with new site setting and Run Explain Data permission capability

Tableau administrators can now control the availability of Explain Data in site settings. Prior to 2021.3, the ability to enable or disable Explain Data was controlled at the server level only using the tsm configuration set option ExplainDataEnabled.

Authors can now control the availability of Explain Data at the workbook level using the Run Explain Data permission capability. For more information, see Explain Data in the Permissions topic.

**Note:** To make Explain Data available in viewing mode, a workbook author must also select the option **Allow Explain Data to be used in this workbook when viewed online** in the Explain Data Settings dialog box. For more information, see Control Access to Explain Data.

Limit the number of tags per item

A new setting allows you to limit the number of tags that users can add to Tableau content, such as workbooks and metrics, and external assets, such as databases and tables. This setting ensures that tags don’t pose resource consumption problems. When you lower the tag
limit, it prevents new tags from being added above the limit, but it doesn’t remove existing
tags on items in excess of the limit. For more information, see Site Settings Reference.

Ensure JDBC or ODBC connection customizations are used by Bridge

If a Tableau Datasource Customization (TDC) file is used to customize your generic JDBC
or ODBC connections, you can use the steps described in Use .tdc files for generic JDBC or
ODBC connections to ensure those customizations are used by Bridge as well.

Monitor Bridge refreshes using JSON logs

Create data sources and views to monitor refresh jobs by connecting to a Bridge client’s
JSON log files. For more information, see Configure the Bridge Client Pool.

Provide feedback to Ask Data lens authors

If you have questions about the structure of a lens or how best to use it with Ask Data, you
can send feedback directly to the author.

1. To the left of the query box for Ask Data, click the "i" icon.

3. At the bottom of the tips dialog, click Contact the Lens Author.

This option is enabled by default, but lens authors can hide it by following the steps in Let
users email you questions about a lens.
Use terms previously reserved for analytical functions in Ask Data

Previously, analytical terms found in data source field names and values were ignored by Ask Data. But now it treats terms like "average," "group," "filter," "limit," "sort," and "date" just like any other form of data, letting you analyze data sources without needing to revise their contents.

Access table calculations in Ask Data

If a published data source contains calculated fields with table calculations that aggregate or sort, Ask Data now indexes and analyzes those just like other fields. (Table calculations that filter or limit data are not supported.)

Use longer field values in Ask Data

Ask Data now indexes field values with lengths of up to 200,000 characters, far above the previous limit of 10,000.

Set up custom OAuth for Dremio

Beginning with version 2021.3, you can set up custom OAuth for Dremio. For more information, see OAuth Connections.

Add-ons

Tableau Catalog - part of the Data Management Add-on

**Inherited descriptions appear in web authoring** - When a description for a field exists upstream from the field, it now appears in web authoring with information about where the description is inherited from. For more information, see Describe fields in a published data source in the Tableau Desktop and Web Authoring Help.

**Assets in personal spaces are indexed** - Tableau Catalog indexes assets in personal spaces, but users who browse through the lineage tool see Permissions required instead of information about workbooks in personal spaces.
Data quality warnings appear in subscription emails - Subscription emails can include data quality warnings for workbooks or views if their upstream assets have warnings. For more information, see Data quality warnings in subscriptions.

Added in August 2021

See color-coded data types and simplified phrasing for limiting and sorting in Ask Data

As you create queries in Ask Data, you'll see helpful color-coded icons that identify data types such as numbers, text strings, tables, and so on. Phrasing for limiting filters and sorting has been simplified too, making Ask Data's interpretations of your queries more clear.

Identify elements used in interpretations for Ask Data

Ask Data has added visual feedback on how your inputs are used in interpretations. Ignored words are grayed out; hovering over remaining words highlights how they're incorporated in the interpretation above.

Edit field descriptions for Ask Data lenses

Lens authors can now customize the description that appears when users hover over a field, better explaining its purpose to the audience of lens users. To change a Description
entry, click the pencil icon to the right of a field name.

```
<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
</tr>
<tr>
<td>Region</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>Postal Code</td>
</tr>
<tr>
<td>Order Date</td>
</tr>
<tr>
<td>Order ID</td>
</tr>
<tr>
<td>Order Profitable?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Sub-Category</td>
</tr>
</tbody>
</table>

Order Profitable?

**Details**

[Boolean]

2 unique values

**Description**

A level of detail expression that calculates profitability for each order

**Formula**

```
{fixed [Order ID]:sum([Profit])}>0
// calculates the profit at the order level
```

---

**Added in June 2021**

Tableau with MFA

As the security landscape evolves and threats that can compromise user credentials grow more common, it's important to implement strong security measures to protect your organization and users. If your organization doesn't work directly with a single sign-on (SSO) identity provider (IdP), you can enable multi-factor authentication (MFA) with Tableau authentication to better secure your user sign-in process.

For more information, see one of the following:

- If you’re a site admin, see About multi-factor authentication and Tableau Online.
- If you’re a user, see Register for multi-factor authentication.

Streamlined site settings for Ask Data

Streamlined site settings for Ask Data now disable or enable the feature site-wide for all data sources. If it’s enabled site-wide, indexing frequency remains customizable for each data
source. For more information, see Disable or Enable Ask Data for a Site.

Organize items in a collection

Collections are like playlists that let users organize content in a way that is meaningful to them. Viewers, Explorers, and Creators can all create and share collections. For more information, see Organize Items in a Collection.

Note that if you participated in the limited preview for collections, the site setting to control public collections no longer exists. Now, permissions for collections are controlled the same way as other types of content. For more information, see Permissions for Collections.

Create workbooks with Salesforce data

You can now integrate Salesforce data into Tableau Online to create starter content for users on your site. Once you connect to Salesforce, Tableau publishes ready-to-use workbooks and data sources to help jumpstart analysis into your Sales and Service Clouds. For more information, see Create Workbooks with Salesforce Data.

Configure settings for extracts in web authoring

You can now configure settings for extracts that you create in Web Authoring. Optionally, configure options to tell Tableau how to store, define filters for, and limit the amount of data in your extract. For more information, see Create Extracts on the Web.

Bring Einstein Discovery predictions into your Prep flows on the web

Beginning with version 2021.2, you can bring prediction models built in Einstein Discovery directly into your Prep flows on the web.

**Note:** You must have a Salesforce license and user account that is configured to access Einstein Discovery to use this feature.

With the power of machine learning and artificial intelligence, you can bulk score your flow data and generate new fields for predicted outcomes at the row level, as well as add top
predictors and recommended improvement fields to include data about which fields contributed to the predicted outcome. Add a Prediction step to your flow, sign into Einstein Discovery and choose from deployed models, and apply them to your flow data. Then generate your flow output and use the new data source to analyze the predicted outcomes in Tableau. This feature was first introduced in Tableau Prep Builder in version 2021.1.3. For more information, see Add Einstein Discovery Predictions to your flow in the Tableau Prep help and Create and Interact with Flows on the Web.

Multiple analytics extensions in a site

Beginning with version 2021.2, you can now create multiple analytics extensions connections for each site. This means that organizations with different language or connection requirements can use analytics extensions on the same Tableau Server site, with different workbooks using different connections. For more information on configuring analytics extensions for your site, see Configure Connections with Analytics Extensions. For details on using analytics extensions, see Pass Expressions with Analytics Extensions (Tableau Desktop and Web Authoring Help).

**Note:** As of 2021.2, Einstein Discovery analytics extensions are still limited to one per site.

Share explanations from Explain Data in published dashboards

Explain Data has a reimagined user interface optimized for a broader audience of business users. Authors (Creators or Explorers with editing permissions) can now enable Explain Data for viewers of dashboards and sheets in published workbooks. Viewers can select a mark of interest in the view and run Explain Data to explore their data more deeply than before.

Access to Explain Data in viewing mode is not enabled by default, so authors will need to enable this option. For information on how to enable Explain Data in viewing mode, see Control Access to Explain Data.

For more information on Explain Data, see Discover Insights Faster with Explain Data, Get Started with Explain Data, and Requirements and Considerations for Using Explain Data.
Configure custom OAuth

As a site admin, you can now configure custom OAuth clients for your site to override default OAuth clients. For more information, see Configure custom OAuth.

Keep more data fresh using Bridge

Bridge adds support for the following connectors:

- Alibaba AnalyticsDB for MySQL
- Alibaba Data Lake Analytics
- Databricks
- Denodo
- Impala
- Kyvos

For more information about Bridge connectivity, see Connectivity with Bridge.

Explore new Admin Insights data sources

Get more visibility into your Tableau Online site with new Admin Insights data sources. You can now connect to the Groups data source to identify the group membership of users or the Site Content data source for governance information about content items on your site. For more information, see Use Admin Insights to Create Custom Views.

Tableau Catalog - part of the Data Management Add-on

**Add Field Descriptions** - You can add descriptions for fields in a published data source that then display in the Description column on the data source page Lineage tab. You can also see the description on the Data tab when you build a visualization. For more information, see Describe fields in a published data source in the Tableau Desktop and Web Authoring Help.

**Data Quality Warning Updates**

- **Formatted text support for warning messages** - When you create or edit a data quality warning message, you can format the text with bold, underline, and italics, and include a link or an image. For more information, see Set a Data Quality Warning.
Message required for warnings - When you create a data quality warning, you’re now required to enter a message to display to users. (This doesn't apply to warnings generated when you set Tableau to monitor for extract refresh or flow failures.) For more information, see Set a Data Quality Warning.

Inherited descriptions appear in Tableau Desktop - When a description for a field exists upstream from the field, it now appears in Tableau Desktop with information about where the description is inherited from. For more information, see Describe fields in a published data source in the Tableau Desktop and Web Authoring Help.

Full table name appears - The table's full name has been added to the table page.

Filter by tags - You can now filter databases, files, and tables by tags in the Connect To dialog box.

Filter by embedded or non-embedded - On the External Assets page, you can filter databases, files, and tables by asset category: embedded or non-embedded.

Create parameter actions on the web

You can now create parameter actions in both Tableau Online and Tableau Server. When you create a parameter action, you customize how data is displayed in your viz. And users can change a parameter value by interacting directly with your viz. For more information, see Parameter Actions.

Create set actions on the web

You can now create set actions in both Tableau Online and Tableau Server. Use sets to define a subset of data, and then use set actions to control how members in a set compare to other data in the view. For more information, see Set Actions.

Added in April 2021

Salesforce Authentication
If your organization uses Salesforce, you can enable Tableau Online to use Salesforce accounts for single sign-on with OpenID Connect. When you enable Salesforce authentication, users are directed to the Salesforce sign-in page to enter their credentials, which are stored and managed in Salesforce. Minimal configuration may be required. See Salesforce Authentication.

Added in March 2021

See new comment and share notifications in redesigned notification center

Users can now see notifications for new comments and shares by selecting the bell icon in the top right corner of their Tableau site. The redesigned notification center also displays updates for flows and extract jobs. With this update, old notifications will continue to be sent by email, but will not appear in the notification center. To continue receiving older notifications via email, navigate to site settings. Under Manage Notifications, select Email for each notification type. For more information, see Tour Your Tableau Site. For settings information, see Site Settings Reference.

Tableau Catalog - part of the Data Management Add-on

**Automated data quality warning** - You can set Tableau to monitor for extract refresh failures and for flow run failures. When a failure occurs, Tableau generates a data quality warning that displays to users. For more information, see Set a Data Quality Warning.

**Quick search results expanded** - Quick search results now include tags on external assets.

Add Einstein Discovery predictions to Tableau dashboards

With the new Einstein Discovery dashboard extension, as users select marks in a view, they see dynamic updates to predictions and suggestions to improve predicted outcomes. Authors can drag the Extension object onto the dashboard canvas, select Einstein Discovery from the extensions gallery, and then configure the extension in Tableau Online. For
more information, see Explore Predictions in Tableau with the Einstein Discovery dashboard extension.

For information on required licenses, access, and permissions in Salesforce and Tableau, see Requirements for access.

For an introduction to Einstein Discovery in Tableau, see the Einstein Discovery in Tableau page and demo on tableau.com.

For details on configuration steps required in order to enable the Einstein Discovery dashboard extension, see Configure Einstein Discovery Integration.

**Added in December 2020**

Create extracts on the web

Now you can create extracts directly in web authoring, without using Tableau Desktop. For more information, see Create Extracts on the Web. You can extract new workbooks in addition to existing workbooks. Optionally, the extract creation can run in the background and you can be notified when it's completed. This will let you close your authoring session while the extract is being created, which can be helpful with large extracts that might take a long time.

Create and interact with flows on the web

You can now create flows to clean and prepare your data using either Tableau Prep Builder, Tableau Server, or Tableau Online. Connect to your data, build a new flow, or edit an existing flow and your work is automatically saved every few seconds as you go. Create draft flows that are only available to you or publish your flow to make it available for others. Run your individual flows right from the web or run your flows automatically on a schedule using Tableau Prep Conductor if you have the Data Management Add-on. For more information, see Create and Interact with Flows on the Web.
Organize items in a collection (limited preview)

Collections are like playlists that let you organize your Tableau content. Create a private collection for personal reference, or make a public collection that can be viewed by other users on your site. For more information, see Organize Items in a Collection.

As a Tableau administrator, you can control whether users can set collections to public by changing the site setting Allow public collections.

Collections are available as a limited preview for Tableau Online. You won’t see collections unless your site is part of the preview. If you’re a Tableau administrator who would like to join the preview, sign up here.

Tableau Catalog updates - part of the Data Management Add-on

Tableau Catalog is included in the separately licensed Data Management Add-on for Tableau Server and Tableau Online. For more information, see About Tableau Catalog.

The following features are included in this release:

**Data Quality Warning History admin view** - Site administrators can see how data quality warnings are being used on the site using the pre-built admin view, Data Quality Warning History. For more information see Data Quality Warning History.

**See quality warning details in Tableau Desktop** - Tableau Desktop users can hover over the warning icon on the Data tab to see details about the data quality warnings affecting the data in their workbook. For more information, see Set a Data Quality Warning.

**Metrics appear in lineage and show data quality warnings** - Data quality warnings now appear on metrics affected by a warning. Metrics also appear in the Lineage tool, enabling you to see how a metric might be affected by data changes when performing impact analysis. For more information, see Create and Troubleshoot Metrics.

Tableau Prep Conductor updates - part of the Data Management Add-on

Now, the Data Management Add-on is only needed to schedule and monitor flows with Tableau Prep Conductor. Other flow-related tasks no longer require you to license the add-
on. For more information, see Tableau Prep Conductor.

Analytics extensions

Analytics extensions allow you to extend Tableau dynamic calculations in a workbook with languages like R and python, and with other tools and platforms. These settings endpoints enable you to configure analytics extensions on your site in Tableau Online. See Configure Connections with Analytics Extensions.

Ask Data Usage and Adoption admin view

You can now see how users engage with Ask Data on a site, using the new Ask Data Usage admin view. The dashboard highlights the top Ask Data users, data sources, and data source owners, along with headline value metrics. For more information, see Ask Data Usage.

Added in September and October 2020

Bridge (legacy) schedules have moved to a new location

For an extract data source that needs to use a Bridge (legacy) schedule to keep data fresh, you can find and configure a Bridge (legacy) schedule from its new location in the actions menu on the data source page. For more information, see Set Up a Bridge Refresh Schedule.
Note: Recommended schedules have not changed location and continue to be integrated with Online refresh schedules. However, Recommended schedules is no longer labeled as "Recommended" to better reflect the integration. All the Bridge-related updates described here have been made to support the new Online scheduling experience.

Custom Extract Refresh schedules

Extract refresh scheduling is now fully customizable and no longer need to be selected from an pre-populated list of schedules. You now have the ability to create and manage customized hourly, daily, weekly, and monthly schedules for the extract refreshes.

For more information, see Schedule Refreshes on Tableau Online.

Turn off Web Page objects

To prevent Web Page objects in dashboards from displaying target URLs, deselect Enable Web Page Objects in the site settings.

Added in August 2020

Set the Site Time Zone for Extracts
Tableau Online Help

The default time zone for extract-based data sources in a site is Coordinated Universal Time (UTC). Site administrators can now choose to set a different time zone.

For more information, see Change Time Settings.

Automatically Suspend Extract Refreshes for Inactive Workbooks

To save resources, Tableau can automatically suspend extract refresh tasks for inactive workbooks. This feature applies to full extract refreshes only, not to incremental extract refreshes. This feature only applies to refresh schedules that run weekly or more often.

For more information, see Automatically Suspend Extract Refreshes for Inactive Workbooks.

Manage Licenses for User Groups with Grant Role on Sign In

Administrators can set a minimum site role for user groups and choose Grant role on sign in when creating or modifying that user group. Enabling Grant role on sign in reduces manual work to manage licenses, since administrators can designate site role capabilities by group, and provision licenses when a user actually needs it. By waiting to grant licenses until users sign in, administrators can streamline license provisioning, without granting licenses to inactive users. For more information, see Grant License on Sign In.

Tag Stale Content for Archiving

The Stale Content Admin view that was introduced in 2020.2, now has an added functionality that allows you to tag content as stale. You can then choose to archive the tagged content. For more information, see Stale Content.

Tableau Catalog updates - part of the Data Management Add-on

Tableau Catalog is included in the separately licensed Data Management Add-on for Tableau Server and Tableau Online. For more information about Tableau Catalog, see About Tableau Catalog.

The following features are included in this release:
**See data quality warnings in Tableau Desktop** - When you open a workbook in Tableau Desktop that has a data quality warning, the warning icon (either a blue circle or a yellow triangle with an exclamation point) appears on the Data tab on the sheet page of the workbook. For more information, see Set a Data Quality Warning

**‘Sensitive data’ warning type added** - You can use this new warning type to set a data quality warning for sensitive data in your organization. For more information, see Set a Data Quality Warning

**Embedded assets are listed in External Assets** - You can now see embedded assets listed in the External Assets page. For more information, see Use Lineage for Impact Analysis.

**Tag external assets** - Add tags to databases, tables, and columns, which enables you to, among other things, tag tables and columns with personally identifiable information (PII). For more information, see Tag Items in Tableau Desktop and Web Authoring Help.

Web authoring and interaction with views

New features and enhancements related to web authoring and interacting with views on the web are listed in What’s New in Tableau for Users and Web Authoring and Tableau Desktop Feature Comparison. For topics related to web authoring and interacting with views, see Using Tableau on the Web.

**Added in June 2020**

Tableau Bridge

**No Bridge upgrade or installation required – for publishers**

For publishers working exclusively with data sources that connect to on-premises relational data, you no longer need to maintain your current client or upgrade to the latest. As long as you migrate your refresh schedules using Recommended schedules (next bullet), and your admin has installed and set up at least one Bridge 2020.2 client, you’re all set. For more information, see Set Up a Bridge Refresh Schedule.
Integrated refresh schedules

Refresh schedules for Bridge are now integrated with Tableau Online refresh schedules. For publishers, integrated refresh schedules, called **Recommended** schedules, mean:

- You have more control and flexibility to manage your own data sources.
- Your dependence on site admins is reduced for certain data source management tasks like updating connections credentials.

For more information, see Online schedules versus Bridge (legacy) schedules.

Keep private cloud data fresh

Use Bridge to keep cloud data, accessible only from inside a private network, fresh. For more information, see Use Bridge for Private Cloud Data.

Pooling enabled for extract refreshes

Clients can pool extract refreshes, in addition to live queries, across all 2020.2 clients in the network. For site admins, pooling of extract refreshes means:

- You can focus on providing availability, throughput, and latency.
- You can optimize the composition of your client pool to match the characteristics of your live query and extract refresh workloads.

For more information, see Configure the Bridge Client Pool.

Updated Settings page
For site admins, the simplified Bridge Settings page allows you to configure which clients to include or exclude from the pool and displays a warning icon to make it easier to know which clients need to be upgraded to the latest version. For more information, see Configure the Bridge Client Pool.

<table>
<thead>
<tr>
<th>Computer Name</th>
<th>Owner</th>
<th>Pool</th>
<th>Version</th>
<th>Connection Status</th>
<th>Last Connected</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG2AMAZ-32N4</td>
<td>Jean</td>
<td>Not pooled</td>
<td>20201.20.0219.0753</td>
<td>Disconnected</td>
<td>Apr 22, 2020, 7:56 PM Delete</td>
<td></td>
</tr>
<tr>
<td>EC2AMAZ-UVM</td>
<td>Fa Sa</td>
<td>Default</td>
<td>20202.20.0525.1210</td>
<td>Disconnected</td>
<td>Jul 8, 2020, 12:48 AM Delete</td>
<td></td>
</tr>
<tr>
<td>FSA</td>
<td>Fa Sa</td>
<td>Not pooled</td>
<td>20201.20.0409.1143</td>
<td>Connected</td>
<td>Jul 10, 2020, 5:46 PM Delete</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The warning icon shows only when there is a newer client available for download. The warning icon is not an indication that there are issues with the client or related Bridge data sources.

**Added in May 2020**

Site Capacity Updates for Extract Refreshes

To improve site performance and ensure a consistent scheduling experience, sites are allocated daily and concurrent extract refresh capacity. For more information, see Tableau Online Site Capacity.

Use relationships to combine data for multi-table analysis

Relationships are a new, flexible way to combine data for multi-table analysis in Tableau. Data sources now support multi-table data models in a new logical layer. Tableau recognizes the separate tables in your data source and performs aggregations at the native level of detail for each table.

Creators can combine tables using relationships. Using relationships between logical tables makes it easier to explore and analyze multi-table data at the right level of detail, without having to write specialized calculations to control aggregations like averages and totals.
You do not need to specify join types for relationships; during analysis Tableau automatically selects the appropriate join types based on the fields and context of analysis in the worksheet.

Note: Your workbook must use an embedded data source for you to be able to edit relationships in the Data Source page in web authoring in Tableau Server or Tableau Online. You cannot edit the data model of a published data source.

In support of multi-table analysis, several parts of the Tableau interface have changed. The Data Source page (canvas, data grid), View Data window, and the Data pane in the worksheet have all been updated to support a multi-table analysis experience. For more information, see Changes to different parts of the interface.

Note: View Data column order has changed in Tableau 2020.2 and later. This change is required to support relationships and logical tables. For details, see View Data column order changes in Tableau 2020.2 and later.

For more information about relationships and changes to data sources, see these topics:

- What’s Changed with Data Sources and Analysis in 2020.2
- Questions about Relationships, the Data Model, and Data Sources in 2020.2
- The Tableau Data Model
- Relate Your Data and Optimize Relationships Using Performance Options
- How Analysis Works for Multi-table Data Sources that Use Relationships
- Troubleshoot Multi-table Analysis
- Walkthrough: Don’t Be Scared of Relationships

Also see this Tableau blog post: Relationships, part 1: Introducing new data modeling in Tableau
Create metrics to track data

Metrics help users track changes to their data. Users can create metrics from a view and use them to monitor key numbers like daily sales. For information on how users create metrics, see Create and Troubleshoot Metrics.

Tableau Online administrators can ensure that users are able to create metrics or disable metrics for the site. For more information, see Set Up for Metrics.

Add a Set Control to let users quickly modify the members of a set

With a Set Control, your audience can select the members of a set without necessitating edit mode. Users can simply add or remove set members by interacting directly with the card in the view. Coupled with Set Actions, you have two powerful, complementary features that make it easy to visualize the set you’re interested in.
For more information, see Create Sets, or check out this blog post, Powerful analytics in a user-friendly package with the set control.

Add or remove values from a set by interacting directly with the viz

Now, using Set Actions, you and your audience can use the viz itself to incrementally add values to or remove values from a set. Simply interact with the viz and choose which marks to include or exclude. Coupled with the new Set Control feature, you have two powerful ways to gain deeper insights into your data.
For more information, see Set Actions.

Upload and open workbooks with a browser

Users can now upload a Tableau workbook to your Tableau site without publishing through Tableau Desktop, the REST API, or TabCmd. In a Tableau site, users with a Creator or Explorer (can publish) site role can select **New > Workbook Upload** to upload a .twb or .twbx file (up to 50 MB) to a project. For more information, see Upload Workbooks to a Tableau Site.
Access Dashboard Starters from Home in Tableau Online

Site Administrator Creators can now access Dashboard Starters from the Home page in Tableau Online. Use these pre-designed dashboards to quickly visualize data from common business applications like Salesforce or ServiceNow ITSM. For more information, see Use Accelerators to Quickly Visualize Data.

Tableau Catalog updates - part of the Data Management Add-on

Tableau Catalog is included in the separately licensed Data Management Add-on for Tableau Server and Tableau Online. For more information about Tableau Catalog, see About Tableau Catalog.

The following features are included in this release:

**Raise the visibility of important warnings** - You can set a data quality warning to be highly visible, so that users of a visualization that’s affected by the warning see a notification, and the warning displays in a more prominent yellow color elsewhere in Tableau. For more information, see Set a Data Quality Warning and "Use Data Details to see visualization information" in Explore and Analyze Data in a View in the Tableau Desktop and Web Authoring Help..

**Dashboards appear in the Lineage pane** - When you select the Dashboards item in the lineage, you can see a list of downstream dashboards. For more information, see Use Lineage for Impact Analysis.
Filter external assets on Certified and data quality warnings - In addition to using search to narrow down your choices on External Assets, you can now filter databases, files, and tables by Certified and by data quality warnings.

More filters when connecting - When you connect to data, you can filter databases and table on connection type.

More information on what's new

Other new features and enhancements related to web authoring and interacting with views on the web are listed in What’s New in Tableau for Users and Web Authoring and Tableau Desktop Feature Comparison. For topics related to web authoring and interacting with views, see Using Tableau on the Web.

Added in February 2020

Refresh parameters automatically with dynamic parameters

Now you can set a parameter’s current value to be the result of a single-value, view-independent calculation. In addition, you can refresh a parameter’s list of values (or domain) based on a data source column. This means that each time the workbook is opened and Tableau connects to the data source referenced by the parameter, every place in the workbook that references the parameter will use the latest value or domain.
For more information, see Create Parameters.

Automate user provisioning and group synchronization through an external identity provider

You can automate adding or removing users from Tableau Online or adding or removing members from groups using your identity provider (IdP). Tableau Online IdP user management uses the System for Cross-domain Identity Management (SCIM) standard, which is an open standard for automating the exchange of user identity information. Currently we support SCIM with the following IdPs:

- Okta
- OneLogin

SCIM is used to provision users in cloud applications such as Tableau Online. Cloud IdPs centrally manage user identities, including assigning users to applications and groups. The
IdP uses the SCIM standard to ensure that “downstream” applications are kept in sync with the provisioning assignments set up with the IdP. Managing users in this way improves security, and can greatly reduce the amount of manual work that Tableau Online site administrators need to do to manage site users and group membership.

For more information, see Automate User Provisioning and Group Synchronization through an External Identity Provider.

Support for login-based license management

Login-based license management, helps you manage licensing for users with Creator roles on Tableau Server and Tableau Online. Users with Explorer or Viewer roles cannot use this feature. If you’re using Role Based Subscriptions with Tableau Server or Tableau Online, you can simplify your license management using login-based license management to eliminate separate Tableau Desktop and Tableau Prep Builder product keys. You only need to manage one or more product keys for on-premises Tableau Server, or in the case of Tableau Online, you don’t need to manage any product keys at all.

For more information, see Activate Tableau using Login-based license management.

Updates for Permission Dialog

Set permissions faster with the new permissions dialog. New permission templates and capability groupings match common user scenarios. Editing permission rules is easier than ever with direct editing—double click to enter edit mode. Search for groups and users simultaneously without preselecting your choice. Copy a custom permission rule and paste it for another group or user. And hand off project management to Project Leaders more intuitively with the new setting. For more information on permissions, see Permissions.

Lock nested projects

Regulating permissions is now more flexible. Project permissions can be locked independently for nested projects. Top-level projects can act as organizational containers for projects with different permission models. Non-admins can create new locked projects. For more information, see Lock content permissions.
The following features are included in this release:

**Added connectors** - Connect to more data from external assets. We've added support for the following connectors: Google Big Query, Google Drive, Google Sheets, Box, Dropbox, and OneDrive.

**Create workbooks** - Create a workbook from the External Assets page or from a database or table page for Catalog-supported connections. For more information, see "Tableau Catalog users create workbooks from external assets" in the Tableau Desktop and Web Authoring Help.

**Filter on Certified and data quality warnings** - Filter data sources, databases, files, and tables by Certified, filter data sources by connections, and filter databases and tables by data quality warnings. For more information, see "Open the Connect to Data page" in the Tableau Desktop and Web Authoring Help.

**Enhanced Data Details pane** -

- See a sparkline with the number of times a sheet or dashboard was viewed over the last 12 weeks.
- Easily see that there are Warnings on a view.
- Expand a field to see its metadata, such as a description or calculation.
When a field in a workbook inherits its description, see where the description comes from.

For more information, see "Use Data Details to see visualization information" in Explore and Analyze Data in a View in the Tableau Desktop and Web Authoring Help.

Added in October 2019

Web authoring and interaction with views

For a comprehensive list of new features and enhancements related to web authoring and interacting with views on the web, see the features listed under "Prepare, Author, and View Data on the Web" in What's New in Tableau for Users and Web Authoring and Tableau Desktop Feature Comparison. For topics related to web authoring and interacting with views, see Using Tableau on the Web.

Recommendations for views

Tableau Online now provides recommendations for views to help users discover relevant content. To learn more about these recommendations, see Discover Recommended Views.

You can control whether recommendations appear on your site, or whether user names appear on recommendation tooltips, by adjusting the options under Recommendations for Views on the Settings page.

Table visualization enhancements

Authors can now create wide tables with up to 50 columns. Wide tables with discrete fields can also now be scrolled horizontally. For more details, see Define Table Structure. Also, see this post on 50-column tables from Tableau Public Ambassador Marc Reid on the datavis.blog.
Create extracts on the web

Now you can create extracts in the browser, without using Tableau Desktop. For more information, see Create Extracts on the Web. You can also use the new createextracts and deleteextracts commands in tabcmd to create or delete extracts for a published workbook or data source. For more information, see tabcmd Commands.

Get view load times with Admin Insights (beta)

Included with the latest version of Admin Insights, is the Viz Load Time Drilldown dashboard and the TS Web Requests data source. You can use both resources to help users who are authoring views better understand the experience of the users who are consuming those views. For more information, see Explore the pre-built workbook and Explore the data sources.

The dashboard and data source are available to you as in-release beta features by request. To join the beta or provide thoughts and ideas about the new Admin Insights content, sign in to the Early Feedback site.

Disable email notifications when Tableau Bridge clients aren't running

If scheduled refreshes appear to be running outside of schedule or if you want to stop notifications you receive about clients not running, you can disable email notifications. For more information, see Change the Bridge Client Settings.

Request access

Users can now request access to see a project, workbook, or view when they don't have viewing permission. When someone requests access to content, Tableau routes an email to the person who controls permissions for that content with information about the request and instructions on making access changes. For information on managing permissions, see Permissions.
Limit visibility of user information

The User Visibility site setting lets administrators manage if users with Viewer and Explorer site roles see other users and groups on the site, which can be important for sites used by multiple clients. When User Visibility is set to **Limited**, Explorers and Viewers cannot see information about other users, including aliases, project ownership, comments, and more. Creators and administrators (including Site Administrator Explorers) can still view user information. By default, User Visibility is set to Full. For more information, see Manage Site User Visibility.

Enable or disable Ask Data for a site

As a site administrator, you can control the availability of Ask Data in the **General** area of site settings. For more information, see Disable or Enable Ask Data for a Site.

Manage Sandboxed Extensions

Tableau now supports Sandboxed extensions, which are a new type of dashboard extension that run in a protected environment hosted by Tableau. Like Network-enabled extensions, Sandboxed extensions are web applications that run in custom dashboard zones and can interact with the rest of the dashboard using the Tableau Extensions API. While Network-enabled extensions have full access to the web, Sandboxed extensions can’t share data or make network calls outside of Tableau. Sandboxed extensions provide a new level of security for Tableau users and administrators.

To learn more about controlling extensions, see Manage Dashboard Extensions in Tableau Online. To learn more about extension security and strategies for deployment, see Extension Security in Tableau Server Help.

**Added in September 2019**

Support for Italian added

Tableau has added support for Italian. You can now set Tableau to display the user interface in one of eleven languages:
Tableau Online Help

- Chinese (Simplified)
- Chinese (Traditional)
- English (United Kingdom)
- English (United States)
- French
- German
- Italian
- Japanese
- Korean
- Portuguese
- Spanish

For more information, see Change language and locale in the Tableau User Help.

In addition to supporting Italian in all Tableau products, the Help is also available in these languages. To read the help in your preferred language, navigate to the bottom of the Tableau Help page on the Tableau website, and select the language from the footer.

Tableau Data Management Add-on

The Data Management Add-on is a new license that helps customers manage Tableau content and data assets in their Tableau Server or Tableau Online environment. Tableau Prep Conductor and Tableau Catalog are included in the Data Management Add-on. For more information, see About Data Management.

Tableau Prep Conductor—part of the Data Management

Tableau Prep Conductor is included in the separately licensed Data Management Add-on for Tableau Server and Tableau Online. Tableau Prep Conductor leverages the scheduling
and tracking functionality of Tableau Online so you can automate running flows to update the flow output instead of logging into Tableau Prep to manually run individual flows as your data changes. For more information, see Tableau Prep Conductor.

Tableau Catalog features—part of the Data Management

Tableau Catalog is included in the separately licensed Data Management Add-on for Tableau Server and Tableau Online, making a variety of features available to you in the data management space. You can use Tableau Catalog to discover data, curate data assets, communicate data quality, perform impact analysis, and trace the lineage of data used in Tableau content. For more information, see About Tableau Catalog.

Tableau Metadata API

If you’re a developer and interested in accessing metadata indexed by or surfaced through Tableau Catalog, see the Tableau Metadata API Help.

Explore and inspect views with Explain Data

Inspect, uncover, and dig deeper into marks in a viz using Explain Data. Explain Data gives you a new window into your data by proposing statistical explanations for a selected mark, including potentially related data from the data source that isn’t in the current view.

Creators and Explorers with editing permissions can use Explain Data when editing a view in Desktop, or editing a view on the web in Tableau Online or Tableau Server.

Explanations give you information and visualizations on the data points might be affecting the mark value. You can then open visualizations for further exploration. For more information, see Inspect a View using Explain Data in Tableau User help.
Ask Data improvements

Users can now embed Ask Data into HTML pages, adjust relative date filters, and see top and bottom outliers in context. For more information, see Automatically Build Views with Ask Data in the Tableau User Help.

Data source owners and Tableau administrators can now add synonyms for field values, in addition to field names. For more information, see Optimize Data for Ask Data in the Tableau User Help.
Job Management

Site administrators can now view, monitor, and manage jobs. For more information, see Managing Background Jobs in Tableau Online.

Added in May 2019

Select from ten different languages for Tableau

Tableau has added support for two new languages, Chinese (Traditional) and English (United Kingdom). You can now set Tableau to display the user interface in one of ten
Tableau Online Help

languages:

- Chinese (Simplified)
- Chinese (Traditional)
- English (United Kingdom)
- English (United States)
- French
- German
- Japanese
- Korean
- Portuguese
- Spanish

For more information, see Change language and locale in the Tableau User Help.

In addition to supporting two new languages in all Tableau products, the Help is also available in these languages. To read the help in your preferred language, navigate to the bottom of the Tableau Help page on the Tableau website, and select the language from the footer.
Help Design

A blue **Send feedback** icon is displayed in the bottom right corner of every Help page to make it easier for you to send feedback about the content in a topic. Click the icon to let us know if a topic is helpful to you, and also to comment on what needs improvement.

**Use Admin Insights to create custom admin views**

Enable the Admin Insights project for your site to create custom admin views about Tableau Online adoption, site traffic, license allocation, and more. For more information, see Use Admin Insights to Create Custom Views.
Configure email alerts for incomplete extract refreshes

As an extract data source owner whose scheduled refreshes are performed by Tableau Bridge, you can configure Tableau Online to send you email alerts for incomplete refreshes. For more information, see Change the Bridge Client Settings.

Tableau Bridge improvements

Here are some additional improvements made to the Tableau Bridge client and workflow.

- Access Tableau Bridge-related admin views from the client menu.
- Quickly identify whether live queries are supported directly from the client.
- Receive email alerts when a scheduled refresh cannot start because the client is not running.

**Note:** After Tableau Online's upgrade to 2019.2, some data source owners might see an influx of notifications about Tableau Bridge clients not running. For more information, see Scheduled refreshes appear to be running outside of schedule.

Ask Data improvements

For users, Ask Data now lets you ask questions in a conversational style, apply simple calculations, and create multiple sheets. For more information, see Automatically Build Views with Ask Data in the Tableau User Help.
For data managers and site administrators:

- Words like "year" and "date" are reserved for analytical functions and should be avoided in field names.
- The ability to add synonyms for field names is now limited to data source owners and Tableau administrators, providing a more consistent experience for users.
- A Usage Analytics dashboard reveals the most popular queries, top users, and other helpful information.

For more information, see Optimize Data for Ask Data in the Tableau User Help.

Home page and navigation improvements

For users and administrators, new navigation changes and pages make it easier to get started and locate relevant content:
Use the new Home page to access recent views, find favorite content, and see what's popular on the site. The welcome banner and actions are tailored by site role to help users get started.

- Dedicated Favorites and Recents pages give users access to all of their most-important content. Use the sort and filter options on the right side of each page to find relevant content.
- New left navigation panel lets users quickly jump between important pages on the site, including the Explore page, where they can see all site content in one place. The panel is responsive to screen sizes and can be collapsed.
- When users are viewing or creating a visualization, the left navigation panel disappears to make more room for analysis. The compact header makes it easy to navigate through project hierarchy, search the site, and access favorites as needed.

To learn more, see Tour Your Tableau Site in the Tableau User Help.

Alert side panel

When users select Alerts in any view, a new panel shows alerts that already exist for the viz. To create an alert that is visible for others, select Make visible to others when creating the alert. Alerts created prior to 2019.2 are not visible to others, but can be updated to be.

To learn more, see Send Data-Driven Alerts from Tableau Online or Tableau Server in the Tableau User Help.

Custom views supported for Viewer role

Previously, creating custom views required a Creator or Explorer license, but now Viewers can create them too. For more information, see Use Custom Views in the Tableau User Help.
Set a default site start page

Administrators can set a default start page for everyone on a site. When a site user signs into Tableau Online, they will land on the start page set by an administrator. For more information, see Set the Default Start Page for All Users.

Web authoring improvements

- Add a stored procedure with parameters when creating a data source.
- See the status bar in web authoring to find information about your view, including selected marks compared to total marks, rows and columns, and aggregations. For more information on the status bar, see Status Bar Information in the Tableau User Help.
- Change aggregation of a field using the drop field menu. Right-click+drag (on macOS, left-click+Option+drag) a field on any card or shelf and select an aggregation type. This drops the field onto the card or shelf with the aggregation selected.
- Create, edit, and remove parameters.

Added in February 2019

Improved content browsing

You have a new way to browse shared content. When you open a project, you will be able to see all the content that project contains—workbooks, views, data sources, flows, and nested projects—in a single grid or list. Locating content is easier, because you no longer need to navigate separate pages for different content types. For more information, see Tour Your Tableau Site.
Ask Data to automatically create a viz

Ask Data introduces an entirely new way to interact with your data, letting you type a question and instantly get a response right in Tableau. Answers come in the form of automatic data visualizations, with no need to manually drag-and-drop fields or understand the nuances of your data’s structure.

Ask Data lets you ask sophisticated questions naturally, with support for key analytical concepts like time series and spatial analysis, and an understanding of conversational phrases like “last year”, “earliest”, and “most popular”.

Ask Data is available for all user roles with direct access to data sources: Creators, Explorers, and Interactors.

For more information, see Automatically Build Views with Ask Data in Tableau User Help.
Vector tile background maps

Maps created on or published to Tableau Online or Tableau Public now use vector tiles for quicker geographic data exploring. Maps now appear sharper and smoother when you pan and zoom, and labels and icons dynamically resize or reshape to fit your view. The new vector tile maps replace the underlying technology that powers Tableau background maps for a smoother and crisper experience. The background cartography for Tableau maps has also been updated.
New cloud connectors for web authoring

Use the Box, Dropbox, Google Drive, Google BigQuery, and OneDrive connectors to connect Tableau Online or Tableau Server to your data. For more information, see Creators: Connect to Data on the Web.

Project card images

Project card images will no longer appear on the project card unless they are added as the last item in the project description and encapsulated with ! (exclamation marks). For more information, see Add a Project Image.

Suspended subscription notifications

When you subscribe to a view or a workbook, you receive an email snapshot of that content at regular intervals. Now, you’ll receive an email notification if something caused your subscription to fail, with links to resume or delete the failing alert. For more information, see Create a Subscription to a View or Workbook.
See new demographic data in Tableau Online and Tableau Public

Tableau Online and Tableau Public have a new, different source of demographic data than Tableau Desktop. If your map uses a demographic data layer in Tableau Desktop, you may notice some slight differences when that map is published to Tableau Online or Tableau Public, including the time period and value breaks in a legend. In addition, maps that use the “Block Group” Data Layer option in Tableau Desktop will be automatically updated to “Census Tract” when published to Tableau Online or Tableau Public. Six demographic data layers that appear in Tableau Desktop will be absent when maps are published to Tableau Online or Tableau Public:

- Population growth projections
- Household growth projections
- Housing units growth projections
- Effective Buying Income (median)
- Year structure built (median)
- Length of Residence (average in years)

Publishing maps from Tableau Desktop to Tableau Server will not result in any discrepancies.

Filter improvements

Use Ctrl-click (control-click on a Mac) to select multiple values in a multi-value filter in the view. The selected values can be non-contiguous and are indicated with a gray highlight. When the values are selected, you can then click any one of their check boxes to clear or choose the values at the same time.

Web authoring enhancements

- New cloud connectors for web authoring: Use the Box, Dropbox, Google Drive, Google BigQuery, and OneDrive connectors to connect Tableau Online or Tableau Server to your data.

- Data improvements: Authors connecting to a new data source in Tableau Online or Tableau Server can now Run Initial SQL, connect to a custom SQL query, and add a
join calculation to resolve mismatches between fields in a join.

- To better distinguish between dashboard items, you can now rename them using the Item hierarchy area of the Layout pane or the drop-down menu for each object on the canvas.

- After publishing to the web, click Preview device layouts in the browser to see how your designs look on desktop computers, tablets, and phones.

For related information on new features, also see What's New in Tableau Desktop and Web Authoring Help.

Review and monitor Tableau Bridge extract refresh tasks using admin views

Review and monitor extract refresh tasks performed by Tableau Bridge using admin views. For more information, see Bridge Extracts.

Configure a timeout limit for extract refreshes in Tableau Bridge

To ensure that long running refresh tasks don’t prevent other extracts from refreshing, you can enforce a timeout limit for refresh tasks performed by a Tableau Bridge client. For more information, see Configure a timeout limit for refreshes.

Find the Tableau Bridge client version number on Tableau Online

As a site admin, you can check Tableau Online for the version numbers of the Tableau Bridge clients associated with your site.
Note: If the version number for a client is missing, log on to the computer where the client is installed and sign in to Tableau Online from the client. If the version number doesn't display after that, consider upgrading to the latest client.

Help Design

Updates have been made to help you navigate our content, including a new right-hand menu to quickly scan and select different topics on a page.

Added in October 2018

Web authoring enhancements

- Build density maps and charts. Use the density mark to create maps and charts that can help you identify "hot spots" in your data.

- Add image objects to your dashboards. Easily adjust your image, add a target URL, and add alt-text to improve the accessibility of your dashboard.

- Add navigation buttons to dashboards. Buttons can help users navigate to another dashboard, a sheet, or a story. Optionally customize the button with an image of your own, or add guiding tooltip text.

- Make worksheets transparent by setting the worksheet background color to None.

- Select Duplicate as Crosstab to insert a new worksheet into your workbook and populate the sheet with a cross-tab view of the data from the original worksheet.

- Create, move, and resize point, mark, and area annotations.

For related information on new features, also see What’s New in Tableau Desktop and Web Authoring Help.
Product help search, navigation, and layout improvements

Search results within the product help have been expanded to include results for all Tableau products and help articles. Help layout and navigation, such as table of contents placement and breadcrumbs, have been updated to create a more consistent cross-product help experience.

Secure extract data at the row level

Secure your extract data at the row level using existing approaches for implementing row-level security in Tableau. For more information, see Restrict Access at the Data Row Level in the Tableau User Help.

Added in July 2018

Tableau Online migrated to Linux servers. For more information, see Tableau Online Pod Migrations on the Tableau website.

Changes to Tableau Help

Search results within the product help have been expanded to include results for all Tableau products and help articles. Help layout and navigation, such as table of contents placement and breadcrumbs, have been updated to create a more consistent cross-product help experience.

Install Tableau Bridge separately from Tableau Desktop

Beginning with the 2018.2 release, you can install Tableau Bridge separately from Tableau Desktop. For more information about Tableau Bridge requirements, compatibility with previous version of Tableau Desktop, and Tableau Bridge client installation, see Install Tableau Bridge.

No auto-restart for Tableau Bridge

The standalone Tableau Bridge client does not use an auto-restart interval to restart itself automatically. For more information about the auto-restart interval required by previous ver-
Tableau Online Help

Concerning Tableau Bridge, see Tableau Bridge Frequently Asked Questions in the Tableau Knowledge Base.

**Note:** If you upgrade from Tableau Bridge 2018.1 and earlier to Tableau Bridge 2018.2, the auto-restart interval that remains in the configuration file is ignored.

Font support in Tableau Online

Tableau Online includes the following "web safe" fonts: Arial, Courier New, Georgia, Tableau, Times New Roman, Trebuchet MS, and Verdana.

If a visualization uses a font that is not available on Tableau Online, Tableau Online displays the visualization using a default system font instead. For more information, see Fonts Not Displaying as Expected After Publishing knowledge base article on the Tableau website.

Validate live connections in Tableau Bridge using Application mode

You can now quickly validate live connections in Tableau Bridge using Application mode. This means you can also choose to run live queries only when you are logged on to Windows if the site administrator has enabled the option. For more information, see How Tableau Bridge Works.

Manage dashboard extensions in Tableau Online

Dashboard extensions are web applications that provide users new ways to interact with data from other applications directly in Tableau. You can control the dashboard extensions that you allow to run in Tableau and can manage the extension's access to data. To learn more about controlling extensions, see Manage Dashboard Extensions in Tableau Online.

Include colleagues on data conversations with @mentions

To engage people in a conversation about compelling data you find in a view, @mention them in comments. As you begin to type a name, matching people with Tableau accounts at your organization appear in a list you can choose from. For more information, see Comment on Views in Tableau User Help.
Site administrators can disable @mentions in the General section of site settings.

Web authoring enhancements

- Enhance dashboard functionality by connecting to external applications with dashboard extensions. See Use Dashboard Extensions in Tableau User Help.
- Use keyboard shortcuts to quickly create and edit views on the web. See Keyboard Shortcuts in Tableau User Help.
- Create multi-connection data sources and join data from different databases (cross-database joins). See Join Your Data in Tableau User Help.
- Union data from the same data connection on the web. See Union Your Data in
When working with file-based data sources, you can pivot data from crosstab format into columnar format. See Pivot Data from Columns to Rows in Tableau User Help.

Copy selected values in your data grid by pressing Ctrl+C (Windows) or Command+C (Mac). Alternatively, to copy selected values in the metadata grid, right-click, and select Copy.

Find fields in the Data pane using schema search.

Better control over sorting. Use nested sort to sort dimension values within the context of each pane. You no longer need to create calculated fields or combine dimensions. For more information, see Sort Data in a Visualization in Tableau User Help.

Also, you can now access the Sort dialog box by right-clicking a dimension field on the Rows or Columns shelves in a view.

If you've changed a view (for example, by adjusting filters), you can now create data alerts without first saving a custom view.

You now have two ways to open the Edit Axis dialog box. Hover near the top of the
axis (vertical axis) or to the right (horizontal axis) and click the drop-down arrow that appears. Or, double-click the axis.

- When you select **Logarithmic** scale for an axis, you now have the option to specify **Symmetric** to display data that contains 0 or negative values on a log scale axis. For details, see **Edit Axes** in Tableau User Help.
• Create and delete annotations by right-clicking the view (in a worksheet or dashboard), and then selecting point or mark annotation. Right-click the annotation again to edit or remove the annotation.
Materialize calculations in extracts already published to Tableau Online

If you need to retroactively materialize calculations in extracts that have already been published to Tableau Online, you can use tabcmd to refresh the published extract with the --addcalculations option. For more information about materializing calculations in extracts, see Materialize Calculations in Your Extracts in the Tableau User Help. For more information about the tabcmd option, see refreshextracts workbook-name or datasource-name.

Added in April 2018

New user-based term licenses are now available

Tableau now offers different types of user-based term licenses that grant a range of web authoring and other capabilities at various price points. This gives organizations more flexibility to fit licenses to the data analysis and visualization needs of different users. To learn more, see User-based licenses, or to see the capabilities of each license, see Tableau Pricing.

Quickly analyze cloud-based data with Dashboard Starters

Dashboard Starters help you quickly author and analyze data from cloud-based systems like Salesforce, ServiceNow, Oracle Eloqua, and Marketo. Simply create a new workbook and choose from several beautiful, informative designs that are tailor-made for key business metrics. For more information, see Use Accelerators to Quickly Visualize Data

Configure additional Tableau Bridge clients to load balance live connections

Site administrators can configure additional Tableau Bridge clients on different computers to load balance live queries. For more information, see Allow Publishers to Maintain Live Connections to On-Premises Data.
Tableau Online Help

Cancel a scheduled extract refresh that's in progress using Tableau Bridge

There may be situations where you need to cancel an in-progress extract refresh. You can cancel an in-progress extract refresh if you have configured the extract to refresh on a schedule using Tableau Bridge. For more information, see Create a Schedule for a Tableau Bridge Data Source.

Connect to data on the web

With a Creator user license, you can connect to data directly in your browser. Upload Excel or text-based data sources, connect to data housed in a cloud database or on a server in your enterprise, or connect to published data saved to your site. For more information, see Creators: Connect to data on the web.

Prepare your data on the web

With a Creator user license, use the Data Sources tab to prepare your data for analysis. Create joins, add new data sources, clean your data using the Data Interpreter, and more. For more information, see Creators: Prepare Data on the Web.

Add an accessible toolbar to an embedded view

Authors can enable an accessible toolbar so that all users can add comments, download the view, or share it with others. For more information, see Publish and embed the view in Author Views for Accessibility.
Download your workbook in an earlier version of Tableau

You may need to download your workbook to a different version of Tableau, for example, if the workbook needs to be opened in an earlier version of Tableau Desktop. You have the option of downloading your workbook in its current version, or downgrading it to an earlier version. For more information about version compatibility, see Make Workbooks Compatible Between Versions.
Web Authoring Enhancements

- When editing a view on the web, you can resize the width of row headers and the height of column headers.

- Show Me is now available for dashboards.

- Double-click an annotation to edit its text.

- Hide or show a Viz in Tooltip worksheet. In the target worksheet that is the Viz in Tooltip, click **Hide**. To show the Viz in Tooltip worksheet again, in the source worksheet, click **Unhide All Sheets**.

- Filter hierarchical data in views by using the **All Values in Hierarchy** filter option.

- Change the Line mark type to a step line or a jump line by clicking the Path property in
the Marks card.

- Double-click an axis to edit axis settings.

**Added in February 2018**

Streamline discussion threads by deleting comments

If a comment is unnecessary or inaccurate, you can quickly delete it. Just click the X in the upper-right corner. For more information, see Comment on Views in Tableau User Help.

**Added in January 2018**

Tableau Online servers were upgraded to version 10.5.

**Recommended data sources**

Recommended data sources show Tableau Desktop users relevant data sources published to Tableau Server and Tableau Online. These recommendations are based on published data sources used by other users in your organization with similar usage behavior as the current user.

To keep the recommendations accurate and up to date, the server checks for the following each day:

- New content - for example, new or updated data sources.

- New usage information - for example, Laura Rodriguez used the Food Catering data source and Henry Wilson used the Monthly Sales data source.

For information on recommended data sources, see Use Certified and Recommended Data Sources and Tables in Tableau User Help.
Nested projects

You can now create project hierarchies when you want to segment content into sub-sections within a larger area. For example, you might create a project for each department. In each of those top-level projects, you can separate content based on how the audience uses it, such as connecting to certified data versus in-progress collaboration. For more information, see the following articles:

- Use Projects to Manage Content Access
- Navigate projects in the article Navigate Tableau on the Web

Extracts use the new .hyper format

When you create an extract, it uses the new .hyper format. Extracts in this new format take advantage of the improved data engine, which supports the same analytical and query performance as the data engine before it, but for even larger extracts. Similarly, when you perform an extract task on a .tde extract, the extract is upgraded to a .hyper extract. For more information, see Extract Upgrade to .hyper Format.

Changes to the way values are computed

To improve data source efficiency and scalability, and produce results that are consistent with commercial databases, values in your data source can be computed differently in version 10.5. In some cases, these changes can cause differences with the values and marks in your view between version 10.4 (and earlier) and version 10.5 (and later). This applies to extract data sources, and can apply to multi-connection data sources, data sources that use live connections to file-based data, data sources that connect to Google Sheets data, cloud-based data sources, extract-only data sources, and WDC data sources. For more information, see Changes to values and marks in the view in the Tableau User Help.

Desktop operating system requirements (64-bit replaces 32-bit)

Starting with version 10.5, Tableau Desktop, Tableau Reader, and Tableau Public (desktop) run only on 64-bit operating systems. Version 10.4 is the last version of Tableau Desktop, Tableau Reader, and Tableau Public to support 32-bit Windows operating systems.
New in Web Authoring

- Add text objects to dashboards and edit them.
- Edit worksheet and dashboard titles. Double-click the title to open the **Edit Title** dialog box.
- Edit trend lines and view a description of the trend model. To view the trend model, hover over any part of the trend line. To edit a trend line on the web, click a trend line and hold the cursor in place, and then click the **Edit** menu.
- Trend lines now include a Power option.
- Create hierarchies by dragging one dimension onto another in the Data pane.
- Set the default color property for a field.
- For quantitative color legends, advanced settings are available (dates not included).
- Edit axes on the web. To open the Edit Axis dialog box on the web, double-click an axis in the view. Options available from the Edit Axis dialog box include **Synchronize dual axes**, clearing the axis range (**Reset**), and editing tick marks. You can also enable or disable **Dual axis** in a field context menu (right-click a measure field on Rows or Columns shelf).

Filtered search hidden by default

Filtered search options are now located on the right side of pages, and are hidden by default. The toggle is a dark icon ( homosex ) when the Filters pane is open and a light icon ( homosex ) when the Filters pane is closed. For details on searching, see **Search Content**.

To use filtered search, click homosex.
Added in 2017

Added in September 2017

Tableau Online servers were upgraded to version 10.4.

Data-driven alerts

When data reaches important thresholds for your business, data-driven alerts automatically send email notifications to key people users specify. For information on how to create and manage these alerts, see Send Data-Driven Alerts in Tableau User Help.

Data source certification

Certification offers a way to promote data sources through curation. Site administrators and project leaders can certify data sources that meet your organization’s security and com-
pliance standards, or any other standards you define. For more information, see User Certification to Help Users Find Trusted Data.

Tableau Bridge support for live connections

Live query functionality in Tableau Bridge can now be enabled by site administrators without requesting access from Tableau. Use Tableau Bridge to maintain live connections to on-premises relational data, and to perform scheduled extract refreshes. For more information, see Use Tableau Bridge to Expand Data Freshness Options.

Enhanced commenting on views

Commenting has been completely redesigned to inspire conversations about data discoveries. The new Comments pane appears to the right of views, rather than at the bottom, so you can see the discussion and the data at the same time. Profile images automatically appear too, helping you quickly identify other users. To share filtered views with them, add interactive snapshots along with your comments to highlight the data you’re describing.

Any comments you add in a desktop browser also appear in Tableau Mobile, and vice versa, so you can easily communicate with colleagues on the go. Comments remain with a view even if you revise the containing workbook (as long as the view name remains the same). For more information, see Comment on Views.

Learn who has seen a view

If you own a view, you can quickly find out who at your organization has seen it. At the top of a main site page, click Views. Then hover over the specific view you’re interested in, and select Who Has Seen This View? from the menu at upper-right.

WCAG-conformant drop-down filters in embedded views

Single Value (drop-down) and Multiple Values (drop-down) filters are now WCAG-conformant when accessed in embedded views. For more information, see Build Data Views for Accessibility and Author Views for Accessibility.
New to Web Authoring

Precise dashboard spacing, with border and background color controls

If you previously used blank objects to refine dashboard layouts, you'll really appreciate the new spacing controls. Padding lets you precisely position items on dashboard, while borders and background colors let you visually highlight them. For more details, see Add padding, borders, and background colors around items.

Turn on the View Toolbar on the web

In prior releases, when authoring on the web, you could only see and use the View Toolbar when working with map views. Now you can turn on the View Toolbar for any view or dashboard in your workbook in web authoring. From the top menu, select Worksheet > Show View Toolbar and select an option.

Edit groups

Starting with Tableau version 10.4, you can edit groups. To edit a group, in the Data pane, right-click a group field and select Edit Group. In the Edit Group dialog box that opens, you can add or remove members from an existing group, as well as create new groups in the group field. You can also choose to Include an Other group. For more information, see Group Your Data.

Create aliases

Starting with Tableau version 10.4, you can create aliases for members in a dimension so that their labels appear differently in the view. To create aliases for a field, in the Data pane, right-click a dimension and select Aliases. In the Edit Aliases dialog box, under Value (Alias), select a member and enter a new name. For more information, see Create Aliases to Rename Members in the View.

Format lines

When you are authoring on the web, you can quickly change all the lines in your workbook. Select Format > Workbook, then expand the Lines section on the Format Workbook and make your selections. For more information, see Format at the Workbook Level.
Added in July 2017

User-specific time zones for subscription schedules

Subscription schedules were previously limited to one time zone, but now users can choose any time zone. At the top of the browser window, click your name, and select My Account Settings. Then, under Subscription time zone, select the time zone for schedules you create.

Added in June 2017

Default task priority for all extract refreshes

To ensure fair distribution of processing for all Tableau Online customers, we’re removing the ability for site administrators to set task priority for scheduled extract refreshes. All previously set priorities will return to the default value.

Added in May 2017

Tableau Online servers were upgraded to version 10.3.

Tableau Online sync client evolves into Tableau Bridge

Limited release, by request. The Tableau Online sync client has gained some new functionality and a new name to go with it. Use Tableau Bridge to maintain live connections to on-premises relational data. Bridge also takes on all of the functionality that was provided in the sync client for scheduling extract refreshes. Your existing schedules will continue to run as previously defined in the sync client.

Live query functionality is currently available to site administrators by request only. For more information, see Use Tableau Bridge to Expand Data Freshness Options.

Encrypted SAML assertions from Identity Providers

Tableau Online now supports encrypted SAML assertions from Identity Providers. To learn more about configuring SAML single-sign-on, see Enable SAML Authentication on a Site.
Site access for support users

Tableau Online administrators can allow approved Tableau support technicians to access their Tableau Online site to help troubleshoot a customer support case. To learn more, see Enable Support Access.

Help Redesign

Starting with version 10.3, Tableau Desktop Help is now known as Tableau Help. Tableau Help contains all help topics related to analyzing and consuming data in Tableau Desktop, Tableau Server, and Tableau Online. This help is for people who create workbooks or data sources and publish them, and for people who want to see, interact with, and share views in Tableau.

We welcome your feedback on this change, as well as any feedback or ideas you might have on how to make our content better. Please use the feedback bar on the top of any page ("Was this page helpful?") to open the comment field and submit your feedback.

Using Tableau on the Web provides links to the topics that used to be located in Tableau Server and Tableau Online help.

New to Web Authoring

Web authoring topics for Tableau Server and Tableau Online are now located in Tableau Help, starting with version 10.3.

Save data source

You now have the option to save a data source that is embedded with a published workbook, as a separate, published data source on Tableau Server and Tableau Online that other users can connect to. When you save the data source, you can choose to update the workbook to connect to the newly saved data source.
Edit quantitative color legends

You can now edit the color palette for continuous color legends in web authoring. You can open the Edit Colors dialog box from the Marks card or by clicking the drop-down arrow on the legend.

**Marks card:**

**Legend:**
You can also set a custom color for the start and end colors by entering the Hex value.

Edit colors on separated legends

When you create separate color legends for measures in your view, you are no longer restricted to using only the default color palette or the color palette assigned to each color legend when the view was published from Tableau Desktop.
In web authoring mode, you can now select different color palettes for each legend. Click the drop-down arrow on the legend to open the Edit Colors dialog box and then select the color palette. You can also set custom start and end colors using Hex values.

Customize how people interact with your map

In web authoring mode, you can now customize how your audience interacts with your map view in the following ways using the Map Options dialog box:

- Show a map scale
- Hide map search
- Hide the view toolbar
- Turn off pan and zoom

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

Format numbers on the web

You can now specify basic number formatting for measures in the view on Tableau Server and Tableau Online. For more information, see Format Numbers and Null Values on Tableau Server or Tableau Online.
Create stories

In web authoring, you can now create a story to tell a data narrative, provide context, demonstrate how decisions relate to outcomes, or to simply make a compelling case. See Create a Story for details.
Create and edit bins

Create bins from continuous measures and edit them in Tableau Server and Tableau Online, similar to how you do it in Tableau Desktop. For details, see Create Bins from a Continuous Measure.

Drag fields to Show Me in the view

Select and drag dimensions and measures of interest to the view area. A "Show Me" view is automatically created. You can then click other Show Me options to try different view types.
Drill up and down a continuous hierarchy in the view

In a view with a continuous hierarchy, hover near the headers on a continuous axis to display the + and - controls. Click to drill down or up.
Added in March 2017

Google authentication

Google authentication gives you the convenience of using your Google ID and password with Tableau Online, thus reducing the number of sign-in prompts when accessing Tableau Online. Your site administrator can manage these credentials in a central location so that you no longer need to reset multiple passwords. For more information about Google authentication, see Authentication.

Custom schedules for subscriptions

Subscription schedules used to be limited to a set of standard options, but now you can receive emails on whatever schedule works best for you. To learn more, see Subscribe to Views.
Added in February 2017

Tableau Online servers were upgraded to version 10.2.

The following items in What’s New in Tableau Server also apply to Tableau Online.

- Support for accessibility compliance
  
  The functionality referred to in this item is for Tableau Desktop authors who want to create accessible views that they publish to Tableau Online or Tableau Server.

- Web authoring enhancements

Added in 2016
Added in November 2016

Tableau Online servers were upgraded to version 10.1.

Web authoring enhancements

- Show or hide headers in a view.
- 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.

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.

New location for downloading tabcmd

The tabcmd installer is now available from the Tableau Server Releases page on the Tableau website. In this location, you can always find the latest version of tabcmd.

The tabcmd download is on the release notes, under the version number.

The link from the Tableau Online Help has changed, too. If you bookmark this link, you can update it at Install tabcmd.

Sign In to Tableau Online

You can sign in to Tableau Online from a Tableau client. Examples of clients include a web browser, Tableau Desktop, Tableau Bridge, and Tableau Mobile. You can sign in to your
site directly, or from a Tableau view embedded in a web page.

Sign-in options and steps

Depending on how your site admin set up your Tableau Online site, you will use one of the following ways to sign in (these are also referred to as authentication types):

- **Single sign-on**

  Single sign-on (SSO) means that your admin has set up the Tableau Online site so that you can use the same user name and password (credentials) you use for other applications in your company.

  When you use SSO, your credentials are managed outside of Tableau Online by a third-party identity provider (IdP). When you enter your credentials to sign in to Tableau Online, it's the IdP that lets Tableau Online know you are an approved user.

- **Tableau with MFA**

  When multi-factor authentication (MFA) is enabled with Tableau authentication, you use a combination of your TableauID credentials and a verification method to access Tableau Online.

  TableauID credentials are made up of an email address and password that you use for accessing your Tableau Online site. These credentials also give you access to other content on the Tableau website, such as on-demand training videos and white papers. You can choose a verification method after you register for MFA. For more information, see Register for multi-factor authentication.

How to know which type of credentials your site uses

If your site is set up for single sign-on (SSO) credentials, generally your site admin will notify you, and you use the same user name and password you do for signing in to other programs in your organization.
If your site admin has set up the site to use Tableau authentication, you receive an email invitation to the site. When you click the link in the email, you can create your password. That email address and password become your Tableau ID. In addition, if MFA is enabled, you are prompted to register at least one verification method to use to confirm your identity each time your sign in.

If you are not sure how the site is set up or which credentials to use, check with your Tableau Online site admin.

To sign in (includes Tableau Online URL)

Do one of the following, depending on where you’re signing in:

<table>
<thead>
<tr>
<th>When signing in from:</th>
<th>Do this:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A web browser</td>
<td>Enter the Tableau Online URL into the address bar: <strong><a href="https://online.tableau.com">https://online.tableau.com</a></strong></td>
</tr>
<tr>
<td>Tableau Desktop, to publish or access content</td>
<td>Select <strong>Server &gt; Sign In</strong>, and enter the Tableau Online URL: <strong><a href="http://online.tableau.com">http://online.tableau.com</a></strong></td>
</tr>
<tr>
<td>Tableau Desktop, to sign in to Tableau Bridge</td>
<td>Select <strong>Server &gt; Start Tableau Bridge Client</strong>.</td>
</tr>
<tr>
<td>Tableau Mobile app</td>
<td>Tap <strong>Sign In</strong>, and then tap <strong>Connect to Tableau Online</strong>.</td>
</tr>
</tbody>
</table>

For sites with SSO

1. On the Tableau Online sign-in page, enter your email address and click **Sign In**.

   You are directed to the sign-in form for the identity provider if you’ve been added to only one site. Enter your user name again and your password. The third-party will authenticate you and direct you back to Tableau Online.
2. If you've been added to multiple sites with SSO, enter the site Uniform Resource Identifier (URI) for the site you want to access, and then click Continue.

As of January 2022, the site URI is required to maintain site privacy. The site URI is the unique identifier for your Tableau Online site and appears in the site URL after authenticating. For example, a site name "Company X" may appear in the URL as https://us-east-1.online.tableau.com/#/site/companyx. To avoid remembering your site URI, you can bookmark site URLs in your browser to quickly redirect and authenticate to that Tableau Online site.

Note: If you don’t remember the site URI, click Forgot Site and follow instructions to verify your email address. Only one verification code is sent within 15 minutes, so be sure to check your spam folder if you don't see an email from Tableau. After verification, you’re redirected to a list of sites associated with your username. You won't need to verify your email address again for 30 days on this client.
For sites with Tableau authentication

1. On the Tableau Online sign-in page, enter your email address and password, and then click **Sign In**.

   If multi-factor authentication (MFA) is enabled with Tableau authentication, you are prompted to verify your identity using the verification you selected during the MFA registration process. **Note:** If you are signing in to Tableau Online or registering for MFA for the first time, see Register for multi-factor authentication below.

2. If your admin has added you to multiple Tableau Online sites, you are prompted to select a site.

To sign out

To sign out, select your display name in the upper-right corner of any page, and then select **Sign Out**.

If your site uses single sign-on, and you do not see a Sign Out link, close the browser tab or window. The Sign Out link does not appear if your site and the identity provider that manages your company’s user information are not configured to support single log-out.

**Remember your sign-in credentials**

If you want Tableau Online to remember your user name, select **Remember me** on the sign-in page. The next time you sign in, Tableau enters your user name. You still need to type your password.
For sites with SSO authentication, Tableau remembers your user name and sets a default site as well. The next time you sign in, Tableau enters your user name and redirects you to the IdP for authentication without prompting for the site's URI.

In both scenarios, the default site will be replaced if:

- You sign in to a different Tableau Online site and select **Remember me** again.
- You use deep links, URLs that point to specific sites, to access Tableau Online and select **Remember me** when signing in to that site.

To make Tableau forget your user information, remove cookies using your web browser.

**Connected clients**

Your site admin has the option to allow direct sign-in from approved Tableau clients. For examples of clients, see this topic's introduction.

After you sign in successfully from a recognized client, Tableau stores your credentials in a secure token that remembers your connection with Tableau Online. When this token is in place, you can access your Tableau Online site directly, without having to sign in.

**Clearing saved sign-ins**

- If you want to disconnect from your site, you can explicitly sign out from the connected client. For example, in Tableau Desktop, select **Server > Sign Out**.
- To remove all existing server connections from Tableau Desktop, select **Help > Settings and performance > Clear saved server sign-ins**.

**Note:** Site admins can disallow secure tokens that store users’ connections to the site.
Sign in to an embedded view in Internet Explorer

When you browse to a web page that has an embedded view, you see a sign-in button in the frame where the view will appear. If you use Internet Explorer (IE), and after entering your credentials, the sign-in button is not replaced with the view, the browser security settings might be blocking access to the view.

IE uses security zones to determine access levels to websites. To display Tableau embedded views in IE, you can add the website you visit and Tableau Online addresses to the correct security zone.

Add web addresses to IE security zones

1. In Internet Explorer, browse to the website that contains the Tableau view.

2. Click the **Tools** button, and then select **Internet Options**.

3. On the **Security** tab, add the website to the appropriate security zone as follows:

   - If the site that contains the Tableau view is internal to your organization, select **Local intranet**, click **Sites**, and click **Advanced**. If the site is not already there, add it to the **Websites** list.
   
   - If the site is external to your organization, select **Trusted sites**, click **Sites**, and add it to the **Websites** list.

4. Add Tableau Online:

   Select **Trusted sites**, and in the **Add this website to the zone** box, enter *.*.on-line.tableau.com.

5. Click **Add**, and then click **Close**.

These steps were taken from the Microsoft Windows page Security zones: adding or removing websites.
Register for multi-factor authentication

To help ensure account security, your site admin might enable multi-factor authentication (MFA) with Tableau authentication. If MFA is enabled, you must register at least one verification method to use to confirm your identity each time you sign in to Tableau Online. **Note:** If you're using Tableau Desktop or Tableau Bridge in conjunction with Tableau Online, you must be running version 2021.1 and later.

MFA is a secure account authentication method that requires you to prove your identity by providing two or more pieces of verification information, also known as “factors”, when you sign in to Tableau Online. The first factor is the username and password you use to sign in to Tableau Online (i.e., your TableauID credentials). The additional factor is a code generated by an authenticator app, such as Salesforce Authenticator or a third-party time-based one-time passcode (TOTP) app.

To compare supported verification methods and review usage requirements, see Verifi-
fication Methods for Multi-Factor Authentication topic in Salesforce Help.

**Important:** In most cases, verification methods for Tableau Online are mobile authenticator apps that you need to install on a mobile phone.

1. Sign in to Tableau Online with your username and password. You are prompted to register for MFA.

2. Select a verification method.

   For example, click Salesforce Authenticator.
3. Follow the steps in the Tableau Online dialog to associate the selected verification method with your Tableau Online account.

For example, if you selected the Salesforce Authenticator app in step 2, you are prompted to do the following:

1. On an iOS or Android mobile device, download and install the free Salesforce Authenticator app from the App Store or Google Play.
2. On the mobile device, after the app installation completes, open the app and tap **Add an Account**.
3. In Tableau Online, enter the two-word phase from the app in the dialog and click **Connect**.
4. To complete the sign-in process, Tableau Online prompts you to approve the sign in request through the authenticator app on the mobile phone. By accepting the request, you are verifying your identity. You are then redirected to your site.

For example, if using the Salesforce Authenticator verification method, do the following:

1. When Tableau Online shows you the following prompt, respond to the push notification.
2. In Salesforce Authenticator, verify the request details are correct.
3. Tap **Approve**. You are redirected to your site.

**Manage verification methods**

After you start using MFA, you can manage verification methods by clicking the **Manage MFA Verification Methods** link in your My Account Settings page in Tableau Online. On this page, you can add or remove additional verification methods. For example, if you get a new mobile phone, delete any verification methods on the old mobile phone. If you’re unable to copy your authenticator app configuration by restoring it from a backup to your new mobile phone, you must install and register an authenticator app again. For more information, see **Manage Your Account Settings**.
About recovery codes - use in emergency scenarios only

To help reduce the risk of a locked-out scenario, we recommend you add **Recovery Codes** as backup after registering for MFA. Recovery codes, to be used in emergency scenarios only, allow you to sign in to Tableau Online if you don't have access to your usual MFA verification methods. If you add Recovery Codes option, a list of ten one-time use codes are generated for you that you can use to sign in to Tableau Online.

**Important:**

- Because the list of recovery codes are not accessible after you've added the Recover Codes option, immediately copy and store these codes in a safe and secure location so that you can use them in emergency situations.
- Recovery codes should not be used as your primary verification method. Instead, recovery codes should be used in emergency scenarios only when you don’t have access to your usual MFA verification methods.
Regain site access after being locked out

**Important:** We strongly recommend that you add Recovery Codes option to help avoid being locked out of your site. Recovery codes should be used in emergency scenarios only.

If you lose all your usual MFA verification methods, you must contact your Tableau Online site admin and request your MFA verification methods be reset. After your MFA verification methods have been reset, follow the procedure in Register for multi-factor authentication to register for MFA again.

**Activate Tableau using Login-based License Management**

Login-based license management is the preferred license management and activation option for Creator roles within Tableau Online, and is enabled by default on your site. Login-based license management allows authorized users to activate and unlock Tableau Desktop and/or Tableau Prep Builder by signing in to Tableau Online. Login-based license management eliminates the need to distribute and manage product keys for Tableau Desktop and Tableau Prep Builder.

You only need one Tableau Online site to authorize an individual Tableau Desktop or Tableau Prep Builder. You can assign Creator roles to users who use Tableau Desktop, and Tableau Prep Builder for license activation and centralized license management. In addition, login-based license management gives you more visibility into license usage.

You can use administrative views on Tableau Online to see the assignment and use of Creator seats in one place. Administrative views provide information about who is using your Creator licenses, and shows the most recent license lease and version of both Tableau Desktop and Tableau Prep Builder, which helps you to monitor your Tableau deployments.

The following Tableau products support login-based license management:
How login-based license management works

When login-based license management is in use, Tableau Desktop or Tableau Prep Builder periodically contacts Tableau Online in order to verify that the user is a Creator and to obtain an authorization to run. Tableau Online contacts the Tableau-hosted authorization-to-run (ATR) service to verify that the Tableau Desktop client is allowed activation. The ATR service verifies and manages the license and the length of the authorization window. The diagrams below show the communication process between the client, Tableau Online, and the licensing service.

Tableau uses common ports (80 and 443) to make internet requests. In most cases, the computer where Tableau Desktop or Tableau Prep Builder is installed and the network it is running on are already configured to allow the necessary access. For more information about the ports used by Tableau, see Internet Access Requirements.

Login-based license management with Tableau Online
1. You install Tableau Desktop or Tableau Prep Builder and select **Activate with your credentials**. You sign into your Tableau Online site.

2. Tableau Online verifies that you are a Creator. If not, you get an error. If yes, Tableau Online communicates with the ATR service.

3. The ATR service returns an ATR lease to Tableau Online.

4. Tableau Online provides an ATR lease to Tableau Desktop or Tableau Prep Builder to finalize activation.

**Use login-based license management**

To use login-based license management, you need to install Tableau Desktop and use it with Tableau Online.

**Step 1: Enable login-based license management**

Login-based license management is enabled by default for Tableau Online and Tableau Desktop starting with version 2020.1. To use login-based license management, you need to install Tableau Desktop and use it with Tableau Online. If you’re using Tableau Desktop version 2020.1 and later, skip to Step 3: Activate Tableau Desktop.

Versions before 2021.1 do not support login-based license management.

**Change login-based license management settings on Tableau Desktop or Tableau Prep Builder at install**

To change login-based license management settings at the command line, you can run the installer .exe file from your computer’s command line as an administrator. If you need to extract the .msi files, follow the instructions to **Extract and run the Windows (MSI) installer**.
Tableau Online Help

To use a duration length other than the default of 14 days/1209600 seconds, include the ATRREQUESTEDDURATIONSECONDS switch. For example:

```
tableauDesktop-64bit-2020-1-0.exe /quiet /norestart ACCEPTEULA=1
ATRREQUESTEDDURATIONSECONDS=43200
```

You must run the command from the directory where the .exe file is located or specify a full path to the location of the .exe file on the computer. Do not run the setup program from a shared directory on your network. Instead, download the .exe file to a directory on the computer where you’re installing.

The following example shows the Windows installer command that disables login-based license management:

```
tableauDesktop-64bit-2020-1-0.exe /quiet /norestart ACCEPTEULA=1
LBLM=disabled
```

or

```
tableauPrepBuilder-64bit-2020-1-0.exe /quiet /norestart
ACCEPTEULA=1 LBLM=disabled
```

To set the default URL for the Tableau Server you want users to use for activation when using login-based license management, add the ACTIVATIONSERVER or WorkGroupServer option.

To update the exe:

```
tableauDesktop-64bit-2021-4-0.exe /quiet /norestart ACCEPTEULA=1
ACTIVATIONSERVER=http://<tableau_online_site_url>
```

To update the registry:

```
reg.exe add HKEY_LOCAL_MACHINE\SOFTWARE\Tableau\Tableau2021.4\Settings /f /v WorkGroupServer /d https://<tableau_server_url>
```
Note: The ACTIVATIONSERVER option is only intended for first time activation. If you have previously signed-in to this version of Tableau, you use the WorkGroupServer (Windows) or WorkgroupServer (macOS) option. For example, if you are using Tableau Desktop version 2021.1 on Windows and have previously signed-in successfully, you would use the WorkGroupServer option to specify an activation server. On Tableau Desktop on macOS, you would use the WorkgroupServer option. On macOS, this option is case sensitive and uses a lowercase "g".

Change login-based license management settings on Tableau Desktop by editing the registry

If Tableau Desktop is already installed, you can change login-based license management settings by editing the Windows registry.

To turn off login-based license management:

```
reg.exe add HKEY_LOCAL_MACHINE\SOFTWARE\Tableau\ATR /f /v LBLM /d disabled
```

To make login-based license management the only login option:

```
reg.exe add HKEY_LOCAL_MACHINE\SOFTWARE\Tableau\ATR /f /v LBLM /d required
```

Or, you can enable, disable, or require login-based license management by editing the registry directly:

1. As an administrator on the computer running Tableau Desktop, make a backup of the registry file before you make any changes to it.

2. Edit the registry, and in HKEY_LOCAL_MACHINE\SOFTWARE\Tableau, find the
hive named ATR and modify the LBLM value to reflect the desired setting:

a. Name: LBLM.

b. Data: enabled, disabled, or required.

3. Restart Tableau so the changes take effect.

Change login-based license management settings on Tableau Desktop on macOS

To change login-based license management settings on macOS, run the following commands in a terminal window to update the preferences file, and then install or restart Tableau Desktop.

To turn off login-based license management:

```bash
sudo defaults write /Library/Preferences/com.tableau.ATR LBLM "disabled"
```

To make login-based license management the only login option:

```bash
sudo defaults write /Library/Preferences/com.tableau.ATR LBLM "required"
```

To set the default URL for the Tableau Server you want user to use for activation when using login-based license management on macOS.

First time activation:

```bash
sudo defaults write /Library/Preferences/com.tableau.ATR LBLM "required"
```

Subsequent activations:

**Note:** On Tableau Desktop on macOS, you would use the WorkgroupServer option. On macOS, this option is case sensitive and uses a lowercase "g".

Login-based license management settings

You use the following settings to change login-based license management, set the ATR duration, and set the activation server URL.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBLM</td>
<td>enabled, disabled, or</td>
<td>Set to <strong>enabled</strong> (the default), the licensing screens will present the two options for activation (product key, or credentials).</td>
</tr>
<tr>
<td></td>
<td>required</td>
<td>Set to <strong>disabled</strong>, login-based license management will not appear on the licensing screens.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Set to <strong>required</strong>, login-based license management is the only way to activate the Tableau Desktop (when the licensing screen appears, it will offer only the credentials option for activation).</td>
</tr>
</tbody>
</table>
### ATRREQUESTEDDURATIONSECONDS

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1209600</td>
<td>Sets the authorization to run (ATR) duration (in seconds), which is the length of time that an instance of Tableau Desktop and Tableau Prep Builder is authorized to run. The default is 1209600 seconds (14 days). Do not use commas as separators in the value.</td>
</tr>
</tbody>
</table>

### ACTIVATIONSERVER

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http://&lt;tableau_online_site_url&gt;</td>
<td>For first time activation, sets the default URL for the Tableau Online site you want users to use for activation.</td>
</tr>
</tbody>
</table>

### WorkGroupServer (Windows)

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>http://&lt;tableau_server_url&gt;</td>
<td>For updates to the Windows registry or macOS plist, sets the default URL for the Tableau Server you want users to use for activation.</td>
</tr>
</tbody>
</table>

**Note:** On Tableau Desktop on macOS, you would use the WorkgroupServer option. On macOS, this option is case sensitive and...
Additional configuration for virtual deployments

Tableau Desktop and Tableau Prep Builder periodically contact Tableau Online or Tableau Server to verify that Tableau is authorized to run, based on its license. Tableau Online or Tableau Server then contacts the ATR service to verify the license and the length of the authorization window.

When configuring a virtual (non-persistent) deployment of Tableau Desktop or Tableau Prep Builder, the duration time should be set to one of the lower values such as 4 or 8 hours.
in order to avoid an over-use activation error message. After the virtual machine (VM) is returned, the ATR service will handle the activation monitoring.

The following flags should be used on a source image prior to publishing Tableau Desktop to end users. Each end user will be activating the software by logging into Tableau Server or Tableau Online with each new VM delivered. No product keys need to be entered if the end user is a Tableau Creator on Tableau Server or Tableau Online.

If you are using login-based license management for Tableau Desktop or Tableau Prep Builder on a VM, you may get an error message that your license information has changed whenever you launch a new VM for Tableau Desktop or Tableau Prep Builder. This error forces a restart, which then asks you to register Tableau Desktop again. This error occurs because the ATR service sends a new token that doesn't match the license cache.

To prevent this from occurring, you can use the SYNCHRONOUSLICENSECHECK and SILENTLYREGISTERUSER options with the Windows installer. For example:

tableau-setup-std-tableau-2020 SYNCHRONOUSLICENSECHECK="true"
SILENTLYREGISTERUSER="true" ATRREQUESTEDDURATIONSECONDS=14400

or

tableauDesktop-64bit-2020-1-0.exe /quiet /norestart ACCEPTEULA=1
ATRREQUESTEDDURATIONSECONDS=14400 ACTIVATIONSERVER-R=http://<tableau_online_site_url> SYNCHRONOUSLICENSECHECK=#"true" SILENTLYREGISTERUSER="true"

If Tableau Prep Builder and Tableau Desktop are being delivered on one Virtual Desktop, ATRREQUESTEDDURATIONSECONDS only needs to be set during Tableau Desktop installation. However, if you plan to install Tableau Prep Builder as a stand-alone, you'll need to set ATRREQUESTEDDURATIONSECONDS during Tableau Prep Builder installation.

Or, you can edit the following registry keys on the source image:

Reg key path: HKLM\SOFTWARE\Tableau\<Tableau version>\Settings\
Reg key (String value, need to set to true to make that feature enabled)

SynchronousLicenseCheck

SilentlyRegisterUser

(Optional) Step 2: Change the authorization to run (ATR) duration

The login-based license management default settings for the authorization to run (ATR) duration are appropriate for most environments, but you can change these default settings if needed. Login-based license management uses the default authorization to run (ATR) duration of 1209600 seconds (14 days), which is the length of time that an instance of Tableau Desktop and Tableau Prep Builder is authorized to run. This means that after the initial authorization, you could use Tableau without any network connection for 14 days before the activation expired.

The default duration value for login-based license management is not appropriate for delivering a non-persistent VM delivery solution to end users. The ATR duration should be lowered to 4 or 12 hours depending on VM use. When a new VM is delivered to an end user, a new authority to run token will be created. When the VM is returned, this token is also returned and is able to be used on the new VM authorization to run request.

**Note:** Login-based license management uses the following hierarchy when determining ATR duration.

1. **ATR Service** – Establishes the minimum (4 hours/14400 seconds) and maximum (90 days/7776000 seconds) ATR durations applicable to all users/installations. It specifies the default ATR duration (14 days/1209600 seconds) if nothing is specified by Tableau Server or Tableau Desktop.

2. **Tableau Desktop** – Can optionally specify the ATR duration \(\text{ATRREQUESTEDDURATIONSECONDS}\) for the computer on which it is installed. If necessary, you can change the default ATR duration (14 days/1209600 seconds) to a setting within the ATR Service minimum (4 hours/14400 seconds) and maximum (90 days/7776000 seconds). This local ATR duration overrides any durations set by the
ATR Service or Tableau Server. However, this default ATR duration cannot be more than the maximum ATR duration set on Tableau Server.

Change the ATR duration on Tableau Desktop by editing the registry

To use a duration length other than the default of 14 days/1209600 seconds, update the ATRRequestedDurationSeconds registry setting. For example:

1. As an administrator on the computer running Tableau Desktop, make a backup of the registry file before you make any changes to it.
2. Edit the registry, and in HKEY_LOCAL_MACHINE\SOFTWARE\Tableau\ATR, update the ATRRequestedDurationSeconds as follows (0 uses the default setting):
   a. Name: Find the string value named ATRRequestedDurationSeconds.
   b. Data: Update the number of seconds the duration should last. For example, add 43200 to set a duration of 12 hours.
3. Restart Tableau so that the changes take effect.

Change the ATR duration on Tableau Desktop on macOS

To use a duration length other than the default of 14 days/1209600 seconds, include the ATRRequestedDurationSeconds preferences setting. For example:

    sudo defaults write /Library/Preferences/com.tableau.ATR ATRRequestedDurationSeconds -string "43200"

Step 3: Activate Tableau Desktop

The 2020.1 and later versions of both Tableau Desktop for Windows or macOS support login-based license management.
1. Run Tableau Desktop setup.

2. The Activate Tableau screen will include the **Activate by signing in to a server** option.

   ![Activate Tableau Screen](image)

   - **Start trial now**
     - Use Tableau for 14 days without restriction.
   - **Activate with product key**
     - Enter a product key to activate Tableau.
   - **Activate by signing in to a server**
     - Sign in to Tableau Server or Tableau Online to activate your Tableau license using login-based license management.

3. Click **Activate by signing in to a server** and then click the Tableau Online link.

   When prompted, enter valid credentials to sign in to a Tableau Online site as a user with a Creator role subscription, and then click **OK**.

### View login-based license usage

You can view login-based license usage for Tableau Online or Tableau Server. The report shows users, hosts, user role, product, version, activations, Creator seats in use, Creator seats not in use, and when a Creator seat was last used. You can view data for the past 30 days up to a maximum of 183 days.
To view the Login-based license management License Usage administrative view:

1. In Tableau Online or Tableau Server, in the navigation pane, click **Site Status**.

2. On the Site Status page, click **Login-based License Usage**.

3. Optional. On the report screen, you can change the time window to show when seats
were last used, filter on actions, filter on user name, and sort by columns.

<table>
<thead>
<tr>
<th>Time Window in Days</th>
<th>Action</th>
<th>UserName</th>
<th>Action</th>
<th>Activated/Inactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>Activated</td>
<td></td>
</tr>
</tbody>
</table>

Troubleshooting

You may encounter one of the following error messages while using login-based license management. Use the information below to resolve the issue.

If login-based license management is available as an activation option on Tableau Desktop, but not enabled on your Tableau Online site, the following error message may be displayed:

*Login-based license management is not enabled on the server you connected to. Select a different server to connect to, use a product key to activate your license, or start a trial to begin working immediately.*

Contact your administrator and/or Tableau account manager to ensure that your Tableau Online site is enabled for login-based license management.
Login-based license management is not enabled on Tableau Desktop

If login-based license management is not enabled on Tableau Desktop, you will not have the option to activate Tableau using your credentials. Prior to version 2020.1, the ability to use login-based license management on Tableau Desktop is not turned on as a default. Check the Tableau Desktop version to ensure the correct version is being used.

If the login-based license management option has been turned off during installation or with an update, see Step 1: Enable login-based license management.

Product key expiration date doesn’t change after purchasing a year subscription

After purchasing a renewal of Tableau Online, it might appear that your Tableau Desktop license is going to expire. This is not the case. In Manage Product Keys, the expiration date for new Tableau Online subscriptions is not updated until two weeks before the previous Site expiration date.

You do not have a Creator license

When attempting to activate from Tableau Desktop, the following error message may be displayed:

*You do not have a Creator license. Contact your administrator to obtain one.*

This error is displayed if you have not been assigned a Creator role. If you belong to multiple sites on Tableau Online or Tableau Server, you need to sign in to the site where you have the Creator role when using login-based license management. Otherwise you’ll get this error.

To verify that the product key you have activated on the server includes Creator licenses, open the TSM web UI and click Configuration, and then click Licensing.
You have activated the maximum number of computers

When attempting to activate from Tableau Desktop, the following error message may be displayed:

*You have activated Tableau the maximum number of times allowed under your account. You must wait for the license activation on another computer to expire before you can activate Tableau again.*

This error is displayed when you activated Tableau from multiple computers with the same Creator user credentials and exceeded the maximum number of activations. You must wait until the authorization-to-run (ATR) token expires on one of the existing computers before attempting to activate a new computer. If you are using non-persistent virtual machines (VMs), you can shorten the ATR duration to prevent this error from occurring again.

To shorten the ATR token duration for maximum activation

If you encounter this maximum use error when using a non-persistent virtual deployment, it is possible to shorten the ATR duration to 4 hours (14400) seconds to avoid the error in the future.

The following steps shorten the lease on a computer previously activated with login-based license management that will no longer be used, in order to free up a seat to be activated on a new computer:

1. Open a Command Prompt as an administrator on a Tableau Desktop computer that will no longer be used.
2. Navigate to the Tableau binaries (\bin) directory, using the following command.
   
   **Windows:** `cd Program Files\Tableau\Tableau \<version\>\bin`
   
   **Mac:** `cd /Applications/Tableau\ Desktop\ <version>.app/Contents/MacOS`
3. Run the following command to set the duration to 4 hours, in seconds (e.g., 14400).
4. Delete the previous ATR token using the following command:

   **Windows:** `atrdiag.exe -deleteAllATRs`
   
   **Mac:** `./atrdiag -deleteAllATRs`

5. Next, overwrite the existing ATR token. Open Tableau Desktop. Tableau displays the “License has Changed” message. Click **Exit** to automatically close and reopen Tableau Desktop.

6. In the registration dialog box, click **Activate**, and then reactivate Tableau Desktop through Tableau Server using login-based license management, which will overwrite the existing token.

7. Close Tableau Desktop and wait for the ATR duration to elapse (e.g., 4 hours) so that the ATR token expires and frees-up a user seat. Do not open Tableau Desktop before the ATR duration has elapsed. Check to make sure the ATR duration has elapsed. The ATR token TTL End should show a date and time in the future (e.g., 4 hours from now).

   **Windows:** `atrdiag.exe`
   
   **Mac:** `./atrdiag`

8. After the ATR token expires and you can successfully sign in to Tableau Server on a new computer.

To return your computer to an unlicensed state

1. Open a Command Prompt as an administrator.

2. Navigate to the Tableau binaries (`\bin`) directory, using the following command:
3. Run the following command:

Windows: `atrdiag.exe -deleteAllATRs`

Mac: `./atrdiag.exe -deleteAllATRs`

**Note:** This removes only the ATR token from the computer. It does not free-up any of the user seats. The user seat is only freed-up after the deleted ATR token expires.

### Your Tableau credentials are invalid

When attempting to activate from Tableau Desktop, the following error message may be displayed:

*Your Tableau credentials are invalid. Contact your administrator to reset your account.*

This error is displayed when your Tableau license is not recognized. Contact your administrator.

### Your computer's clock is not synchronized to the current time

When attempting to activate from Tableau Desktop, the following error message may be displayed:

*Your computer’s clock is not synchronized to the current time. Synchronize your computer’s clock to the current time and then try to activate Tableau.*

This error is displayed when your computer’s clock is not synchronized with the current time. Synchronize your computer’s clock with a time server on the internet or enable automatic time synchronization.
Create Workbooks with Salesforce Data

You can quickly author and analyze Salesforce data in Tableau. Sign in to Salesforce directly from your Tableau Online site and select the clouds you want to explore. Tableau integrates your Salesforce data to create a project with ready-to-use starter workbooks and data sources - choose to explore them on your own or share them with other users on your site.

What’s included with the Salesforce project

The Salesforce project includes starter workbooks and data sources, all built using your Salesforce data. Use the starter workbooks to quickly answer questions about your Nonprofit, Sales, and Service Clouds, or connect to Salesforce Admin Insights to see usage trends in your organization.

Nonprofit Cloud

Connect to Nonprofit Cloud to analyze your organization’s programs and drive impact.
Includes starter workbooks for: Nonprofit Case Management - Service Delivery and Staff Capacity, Nonprofit Case Management Assessments, Nonprofit Case Management Enrollment, Nonprofit Case Management Intake, and Nonprofit Fundraising Overview.

Sales Cloud

Connect to Sales Cloud to visualize your sales funnel and better support your sales team.

Includes starter workbooks for: Account Tracking, Open Pipeline, Opportunity Overview, Opportunity Tracking, Quarterly Sales Results, Top Accounts, and Marketing Leads.

Salesforce Admin Insights

Connect to Salesforce Admin Insights to visualize usage trends and engagement with your organization.

Includes starter workbooks for: Salesforce Admin Insights.

Service Cloud

Connect to Service Cloud to analyze and explore your critical service metrics and cases.

Includes starter workbooks for: Service Overview and Case Tracking.

Connect to Salesforce

Connecting to your Salesforce data is simple. Once you sign in and select the Clouds to explore, Tableau creates a new project and publishes workbooks and data sources on your site. When the publishing process is complete, you can edit the resulting workbooks just like any other, quickly customizing them for your needs.

To connect to Salesforce, you must be an administrator with the Site Administrator Creator site role and have API access to your Salesforce instance. API access requires Salesforce Professional Edition or higher. For more information, see Set Users’ Site Roles.
1. Sign in to your Tableau Online site as an administrator, and select **Settings > Integrations**.

2. On the Integrations tab, click **Connect to Salesforce Data** and complete prompts to authorize access to Salesforce.

3. In the Connect to Salesforce dialog window, select the Clouds you want to explore.

4. Specify a name and initial permissions for the project. You can set permissions for **Only administrators**, or choose to **Inherit permissions from the Default project**. For more information, see Permissions.

5. Review your selections and click **Publish**.

At this point, you’ve created a new project and published starter workbooks. While Tableau prepares extracts of your Salesforce data, sample data appears in the workbooks so you can explore the layout. You’ll receive an email when your Salesforce data is refreshed and added to the workbooks.

**Note:** Depending on the size of your data source, it may take some time to create extracts. You can view the status of your Salesforce extracts on the Background Tasks for Extracts administrative view.

To see your project and other content you have access to, from the navigation menu, click **Explore**.
Use existing Salesforce credentials

If you've already connected to Salesforce, you can use existing credentials to create additional starter workbooks.

From the Integrations tab, click **Connect to Salesforce Data**, and select the Salesforce credentials you want to use from the drop-down menu. Tableau creates a new project every time workbooks publish on your site.

**Note:** Workbooks will publish on the site with your Salesforce credentials embedded. All users with permission to view the workbook will be able to see data based on these credentials.
Schedule refreshes to keep data fresh

To make sure you see the latest information when viewing workbooks or connecting to data sources, you’ll need to schedule refreshes. By default, the Salesforce data extracts created when publishing starter workbooks will not refresh automatically. For more information about refresh schedules, see Schedule Refreshes on Tableau Online.

Follow the steps below to schedule extract refreshes:

1. In Tableau Online, navigate to the project containing your Salesforce content.
2. Select the data source you want to refresh, click Actions, and choose Refresh Extracts...
3. In the Create Extract Refresh dialog window, select the Refresh Type and Refresh Frequency, and click Create.

Subscriptions

You’re automatically subscribed to Salesforce workbooks and will receive notification emails every time the data is refreshed. If you want to update your subscription preferences, see Create a Subscription to a View or Workbook.
Change permissions for projects, workbooks, and data sources

After connecting to your Salesforce data, you can choose how users interact with the Salesforce project, workbooks, and data sources published on your site. Permissions are a great way to make sure the right users have access to the starter content and enable them to build workbooks of their own. For more information about configuring permissions on your site, see Permissions.

Create workbooks in Tableau Online

With your Salesforce data sources, you can create new workbooks through web authoring in Tableau Online or use Ask Data to query and create visualizations automatically.

- **Web Authoring**: Connect to your data directly in Tableau Online to explore and create custom data visualizations of your own. For more information, see Creator: Get Started with Web Authoring in Tableau Desktop help.

- **Ask Data**: Interact with your data by simply typing a question and see automatic data visualizations in response. For more information, see Automatically Build Views with Ask Data in Tableau Desktop help.

Fix grayed-out views by replacing field names

If your organization has customized the data structure of your Salesforce data, you may need to match those changes in the starter workbooks after your data loads in them. For example, if your organization has renamed the Salesforce “Account” field to “Customer”, you’ll need to make a corresponding change in workbooks to avoid grayed-out views like this:
To fix grayed-out views:

1. Above the dashboard, click **Edit**.
2. Navigate directly to the grayed-out sheet.
3. In the Data pane at the left, look for red exclamation points (!) next to field names, which indicate that your organization uses different names.
4. Right-click each of those fields, and choose **Replace References**. Then select the correct field name from the list.
Addressing implicit bias in technical language

In an effort to align with one of our core company values, equality, we have changed terminology to be more inclusive where possible. Because changing terms in certain places can cause a breaking change, we maintain existing terminology in the following places:

- Tableau APIs: methods, parameters, and variables
- Tableau CLIs: commands and options
Tableau Online Help

- Tableau Resource Monitoring Tool installers, installation directories, and terms in configuration files
- Third-party systems documentation

For more information about our ongoing effort to address implicit bias, see Salesforce Updates Technical Language in Ongoing Effort to Address Implicit Bias on the Salesforce website.
Site Administrator Role and Tasks

This topic describes the typical role of the Tableau Online site administrator, and how it differs from the related data manager role. It then lists the core tasks that the site administrator completes to set up your Tableau Online site. Additional topics in this section provide more information about each of the steps.

How we define the site administrator role

We define the site administrator as the person who is in charge of creating and maintaining the framework that enables Tableau Desktop users in your organization to publish, share, manage, and connect to data sources and workbooks. For example, a site manager works with site users and their permissions, in contrast to working directly with content that is published to the site.

The Tableau Online site administrator is typically part of the IT team at your organization. If your organization doesn’t have a formal IT team, the site administrator might be a savvy Tableau Desktop user who takes on this role (the accidental admin, so to speak).

Tasks that are typically outside the site administrator’s realm

In this documentation, we make a distinction between the roles of site administrator and data manager, which is the role for the person who creates and publishes data sources to Tableau Online. Even so, in your organization, the same person might cover both roles. In practice, you’ll divide these responsibilities in the way that works best in your environment. To learn more about the data manager’s realm, see Publish Data Sources and Workbooks.

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.
Tableau Online Help

Before you configure the site, we recommend getting acquainted with the site authentication options, users’ 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>Upload your logo</th>
<th>This simple first step helps you get familiar with the environment while you incorporate your organization’s branding into your site. Sign in, go to the Settings page, and upload your logo where indicated.</th>
</tr>
</thead>
</table>
| Configure site access | If your organization uses single sign-on, you can configure your site to use Google or SAML authentication. Otherwise, you can use the default Tableau ID authentication, where each user signs in using an email address and password that is unique to Tableau Online.  

    In addition to the authentication type, you can determine whether to allow users to sign in directly from Tableau clients after signing in the first time. This is enabled by default. |
| Create projects | Projects 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. |
| Set up the permissions structure | In Tableau, permissions work with site roles to make up a user’s access to the site and its content. |
### Upload your logo
This simple first step helps you get familiar with the environment while you incorporate your organization’s branding into your site. Sign in, go to the **Settings** page, and upload your logo where indicated.

### Add users
Each user who accesses Tableau Online must sign in. Determine the users you want to be able to sign in to the site. If you enabled Google or SAML authentication, determine which of those users will sign in with their single sign-on credentials, and which will use TableauID credentials.

Add or import multiple users at a time based on their authentication type.

### Get your data to Tableau Online
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 will be the shared data sources that other Tableau users can connect to.

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 data sources. For more information, see Keep Data Fresh.

### Analyze site usage and performance
You can monitor usage of published data sources and workbooks, the success of extract refresh tasks, user activity, and so on.
Navigate the Admin Areas of the Tableau Web Environment

As an administrator on Tableau Server or Tableau Online, you can access admin settings that aren’t available to other users to configure sites, users, projects, and to do other content-related tasks.

Access based on site role and number of sites

The menus you get when you sign in to Tableau Server or Tableau Online depend on the following conditions:

- Whether you’re a site or server administrator.
  
  Site administrator access is available on Tableau Online and Tableau Server. Server administrator access is only on Tableau Server.

- Whether you have access to only one site or to multiple sites.
Server administrator

On a **single-site** server, the site selector does not appear, and all other menus are the same.

In a **multi-site** environment, menus along the left enable you to modify a specific site or all sites, and to configure users, groups, schedules, tasks, and server settings.

To access server administrator settings that affect all sites, open the site menu by clicking the arrow next to the current site name, and then select **Manage all sites**.

The **Content** and **Group** tabs go away, and the site menu text changes to **All Sites** to let you know you are managing server-wide settings, and options like **Server Status** reflect the server-wide...
view.

To return to the site administration menus, select **All Sites**, and select the site you want to manage.
Site administrator

If you are a site administrator for Tableau Online or Tableau Server, and you have access to multiple sites, you’ll get menus for selecting which site to manage, and for managing that site’s content, users, groups, schedules, and tasks, and for monitoring its status.

The site selector displays the name of the current site. To go to another site, select the site menu, and then select the site name.

If you have access to only one site, the site selector does not appear, but all other menus are the same.

Server administrator tasks

Server administrators (available with Tableau Server Enterprise only) can do the following:

- 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 settings only for a specific site, you must first navigate to the site. Within each site, you can do the following:
Site administrator tasks

A site administrator on Tableau Online or Tableau Server can do the following tasks:

- Administer content: Create projects, move content from one project to another, assign permissions, change ownership of a content resource, and so on.
- View, manage, and manually run schedules for extract refreshes and subscriptions.
- Add and manage site users.
- Add and manage site groups.
- Monitor site activity.
Customize the Site and Content Settings

Site Settings Reference

As a Tableau administrator, you can customize a site for your organization using the settings below. The settings available to you depend on your site configuration and whether you use Tableau Online or Tableau Server. To view and edit site settings, you must be a Site Administrator on Tableau Online or Server Administrator on Tableau Server.

**Note:** To find a specific setting below, press Ctrl+F (Windows) or Command+F (macOS). Tableau Online and Tableau Server present these settings in a different order.

Accessing site settings

- (Tableau Online) From the Home page, expand the side pane, and click **Settings** at bottom.
• (Tableau Server) If you’re editing an existing site, select it on the Sites page, and then select **Edit Settings**. Or, in a single-site deployment, click **Settings** at the bottom of the side pane.

![Sites page](image)

**General section**

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<thead>
<tr>
<th><strong>Setting</strong></th>
<th><strong>Description</strong></th>
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<tbody>
<tr>
<td>Site Name and ID (Tableau Server Administrators only)</td>
<td>Specifies the site name seen in the user interface and the ID seen in the site URL. (If you are editing the Default site, you cannot change the ID.) You can’t change the “#/site” portion of the URL (for example, <a href="http://localhost/#/site/sales">http://localhost/#/site/sales</a>). In multi-site server environments, these segments appear in the URL for sites other than the Default site.</td>
</tr>
</tbody>
</table>

| Storage (Tableau Server Administrators only) | Select either **Server Limit** or **GB**, and for the latter enter the number of gigabytes you want as a limit for storage space for published workbooks, extracts, and other data sources. If you set a server limit and the site exceeds it, publishers will be pre- |
vented 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.

Revision History
(Tableau Server Administrators only)

- Specifies the number of previous versions of workbooks, flows, and data sources that are stored on the server.

Tableau Prep Conductor

- Controls whether users with appropriate permissions can schedule and monitor flows. Tableau Prep Conductor is part of Data Management. For more information, see About Tableau Prep Conductor.

Web Authoring

- Controls whether browser-based authoring is enabled for the site. When web authoring for workbooks is disabled, users can't create or edit published workbooks from the server web environment but instead must use Tableau Desktop to republish the workbook. When web authoring for flows is disabled, users can't create or edit published flows from the server web environment but instead must use Tableau Prep Builder to re-publish the flow.

For more information, see Set a Site’s Web Authoring Access and Functions in Tableau Online Help.

Managing Users
(Tableau Server Administrators only)

- Determines whether only server administrators can add and remove users and change their site roles, or whether site administrators can too.

If you allow site administrators to manage users, specify how many users they can add to the site by selecting one of the following:

- **Server Limit** adds the number of available server seat licenses. For a server with core-based licensing, there is no limit.
- **Site Limit** lets site administrators add users up to a limit you...
specify.

- Site Role Limit lets site administrators add users of each site role up to the license limit you specify for the site.

For more information, see View Server Licenses.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest Access</td>
<td>Lets people who lack a Tableau Server account see views that have guest access permissions.</td>
</tr>
<tr>
<td>Tableau Catalog</td>
<td>Turns off Catalog capabilities when Tableau Server or a Tableau Online site is licensed with Data Management. For more information, see Disable Catalog.</td>
</tr>
<tr>
<td>Workbook Performance after a Scheduled Refresh (Tableau Server Administrators only)</td>
<td>Pre-computes recently viewed workbooks with scheduled refreshes to open them faster. For more information, see Configure Workbook Performance after a Scheduled Refresh.</td>
</tr>
<tr>
<td>Workbook Performance Metrics (Tableau Server Administrators only)</td>
<td>Lets site users collect metrics on how workbooks perform, such as how quickly they load. To initiate recording, users must add a parameter to the workbook's URL. For more information, see Create a Performance Recording.</td>
</tr>
<tr>
<td>Managed Keychain Clean Up (Tableau Server Administrators only)</td>
<td>Lets site administrators manage saved credential keychains for OAuth connections on the site. For more information, see OAuth Connections.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
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</tr>
<tr>
<td>Automatically Suspend Extract Refresh Tasks</td>
<td>To save resources, Tableau can automatically suspend extract refresh tasks for inactive workbooks. This feature applies only to refresh schedules that run weekly or more often. For more information, see <a href="#">Automatically Suspend Extract Refreshes for Inactive Workbooks</a> in Tableau Online Help.</td>
</tr>
<tr>
<td>Linked Tasks</td>
<td>Lets Server administrators enable users to schedule flow tasks to run one after the other. They can also enable users to trigger the scheduled flow tasks to run using <strong>Run Now</strong>.</td>
</tr>
<tr>
<td>Email Settings</td>
<td>Specifies the From address and message footer seen in automatic emails for alerts and subscriptions.</td>
</tr>
<tr>
<td>Site Invite Notification</td>
<td>For sites with single-sign-on authentication, sends an invite email when new users are added to the site.</td>
</tr>
<tr>
<td>Site Logo</td>
<td>Specifies the image that appears with the site name.</td>
</tr>
<tr>
<td>Start Page</td>
<td>Controls which site page appears when users sign in. By default, the Home page appears, but you can instead open All Projects, All Workbooks, or other pages. For more information, see <a href="#">Set the Default Start Page</a> in Tableau Online Help.</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>User Visibility</td>
<td>Controls what user and group names are visible to other users. For more information, see Manage User Visibility in Tableau Online Help.</td>
</tr>
<tr>
<td>Availability of Ask Data</td>
<td>Controls whether Ask Data lenses are enabled or disabled for data sources. Ask Data lets users query data using conversational language and automatically see visualizations. For more information, see Automatically Build Views with Ask Data in Tableau user Help.</td>
</tr>
<tr>
<td>Availability of Explain Data</td>
<td>Controls whether site users with the appropriate permissions can run Explain Data and authors can access Explain Data Settings. For more information, see Control Access to Explain Data. To learn more about Explain Data, see Discover Insights Faster with Explain Data.</td>
</tr>
<tr>
<td>Automatic Access to Metadata about Databases and Tables</td>
<td>Automatically grants users certain capabilities to external assets using derived permissions. For more information, see Turn off derived permissions in Tableau Online Help.</td>
</tr>
<tr>
<td>Sensitive Lineage Data</td>
<td>Specifies whether sensitive lineage data should be obfuscated or filtered when users don’t have the appropriate permissions to related metadata. For more information, see Sensitive lineage data.</td>
</tr>
<tr>
<td>Cross-Database Joins</td>
<td>Determines where the join process happens when joining data from multiple sources. For more information, see Combine Tables from Different Databases in Tableau user Help.</td>
</tr>
<tr>
<td>Extract Encryption at Rest (Tableau Server Admin-)</td>
<td>Lets you encrypt .hyper extracts while they are stored on Tableau Server. Server administrators can enforce encryption of all extracts on their site or allow users to encrypt all extracts associated with</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tableau Online Help</td>
<td>particular published workbooks or data sources. For more information, see Extract Encryption at Rest.</td>
</tr>
<tr>
<td>Tableau Mobile - Enable offline previews</td>
<td>Controls whether offline previews are generated for display when users access the site on Tableau Mobile. For more information, see Manage Tableau Mobile Data on Devices in the Tableau Mobile Deployment Guide.</td>
</tr>
<tr>
<td>Tableau Mobile - Enable app lock (Appears under Authentication tab for Tableau Online)</td>
<td>Requires a biometric method or device passcode for users to open the site on Tableau Mobile. For more information, see Enable App Lock for Added Security in the Tableau Mobile Deployment Guide.</td>
</tr>
<tr>
<td>Tableau Support Access (Tableau Online only)</td>
<td>Allows Tableau Support technicians access to the site to help troubleshoot support cases. By default, this feature is disabled. For more information, see Enable Support Access.</td>
</tr>
<tr>
<td>Sharing</td>
<td>Allows users to share items directly with other users. When an item is shared, the recipients get a notification and the item is added to their Shared with Me page. If this is not enabled, users can only copy a link to share. For more information, see Share Web Content in Tableau user Help.</td>
</tr>
<tr>
<td>Comments</td>
<td>Controls whether users can add remarks in a Comments side pane for each view and @mention other Tableau users to notify them via email. For more information, see Comment on Views in Tableau user Help.</td>
</tr>
<tr>
<td>Data-Driven Alerts</td>
<td>Lets users automatically receive emails when data reaches key thresholds. For more information, see Send Data-Driven Alerts in Tableau user Help.</td>
</tr>
<tr>
<td>Subscriptions</td>
<td>Lets site users subscribe to views and receive regular emails of them. On Tableau Server, these options are available only if you first configure subscription settings.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Data Quality Warnings in Subscriptions</td>
<td>Controls whether subscriptions include relevant upstream data quality warnings in the email. On Tableau Server, these options are available only if you first turn on and configure subscriptions. For more information on data quality warnings, see Set a Data Quality Warning.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>Data quality warnings are a feature of Tableau Catalog, which is part of Data Management.</td>
</tr>
<tr>
<td>Tagging</td>
<td>Specifies the number of tags that users can add to items. The default limit is 50 tags, and the maximum is 200. For more information, see Use Tags.</td>
</tr>
<tr>
<td>Recommendations for Views</td>
<td>Controls whether recommendations show on the site and whether the names of users who have looked at recommended items show on recommendation tooltips.</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td>If you use Tableau Server, your administrator can disable Recommendations.</td>
</tr>
<tr>
<td>Request Access</td>
<td>Lets users send access requests to content or project owners. For more information, see Let Site Users Request Access to Content in Tableau Online Help.</td>
</tr>
<tr>
<td>Metrics Content Type</td>
<td>Controls whether metrics are available on the site. When enabled, users can create metrics from views and metrics appear as a content type. When disabled, metrics won't appear on the site or continue to sync; however, you can re-enable the feature to bring back previously created metrics. For more information, see &quot;Set Up for Metrics&quot; in Tableau Online Help or Tableau Server Help.</td>
</tr>
<tr>
<td>Web Page Objects and Web Images</td>
<td>Controls whether these Web Page and Image objects can display target URLs. For more information, see Security for Web Page</td>
</tr>
</tbody>
</table>
Personal Space

Allows Creator and Explorer site users to create and save content to a private Personal Space. When Personal Space is turned on, you can set user storage limits. For more information, see Create and Edit Private Content in Personal Space.

Site Time Zone for Extracts

The default time zone for extract-based data sources in a site is Coordinated Universal Time (UTC). Site administrators can set a different time zone. For more information, see Set the Site Time Zone for Extracts in Tableau Server Help or Set the Site Time Zone for Extracts in Tableau Online Help.

Extract Quota Limit Notifications

Sends email alerts to all site administrators when extract refresh jobs are canceled because of extract job capacity issues.

Flow Parameters (Tableau Server and Site Administrators only)

Enables users to schedule and run flows that include parameters. Administrators can also enable flow parameters to accept any value. If this option is enabled, any flow user can enter any value in a parameter, potentially exposing data that the user should not have access to.

Parameters can be entered in an input step for file name and path, table name, or when using custom SQL queries, in an output step for file name and path and table name, and in any step type for filters or calculated values.

Flow parameter settings can be applied at the server level to include all sites on Tableau Server. The settings can be disabled at the site level to include only specific sites.

For more information about using parameters, see Create and Use Parameters in Flows in the Tableau Prep help.

Run Now

Controls who can run jobs manually using the Run Now option from
the web, Rest API, and Tabcmd. By default, this option is selected to allow users to run jobs manually. Clear the check box if only administrators should be allowed to run jobs manually.

**Note:** If you use Tableau Server, your administrator can disable this site setting.

**Manage Notifications**
Controls how site users can receive notifications for events such as extract jobs, flow runs, when another user shares content with them or mentions them in a comment. Notifications can be seen in their Tableau site via the notification center, sent by email, or sent to a Slack workspace. When a notification is enabled, users can configure their notification preferences on their Account Settings page.

**Note:** If you use Tableau Server, your server administrator can disable this site setting.

**OAuth Clients Registry**
For a subset of connectors, you can register a custom OAuth client to override pre-configured OAuth client settings. By registering a custom OAuth client, you enable new and existing connections to use the custom OAuth client instead of the default OAuth client. For more information, see [Configure Custom OAuth](https://www.tableau.com/docs/pro/desktop/install_instructions.html).

### Authentication section (Tableau Online)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authentication Types</td>
<td>Specifies how users can sign in to the site, and how they access it after signing in the first time. Authentication verifies a user’s identity. For more information, see <a href="https://www.tableau.com/docs/pro/desktop/install_instructions.html">Authentication</a>.</td>
</tr>
<tr>
<td>Default</td>
<td>Specifies how users can sign in to embedded views. By default,</td>
</tr>
</tbody>
</table>
Tableau Online Help

### Authentication
- **Type for Embedded Views**: Tableau authentication is selected.

### Manage Users
- **Lets you add new users to the site or change the site role and authentication method for existing users.**

### Automatic Provisioning and Group Synchronization (SCIM)
- **Allows you to manage users on the site through a third-party identity provider (IdP). When enabled, the Base URL and Secret boxes are populated with values to use in the IdP SCIM configuration. For more information, see Automate User Provisioning and Group Synchronization through an External Identity Provider.**

### Connected Clients
- **Allows Tableau clients such as Tableau Mobile, Tableau Bridge, and others to stay authenticated to the server after a user provides sign-in credentials the first time. When turned off, users are required to sign in explicitly each time they visit Tableau Online. For more information, see Access Sites from Connected Clients.**

### App Lock for Tableau Mobile
- **Requires a biometric method or device passcode for users to open this site on Tableau Mobile. For more information, see Enable App Lock for Added Security in the Tableau Mobile Deployment Guide.**

### Bridge section (Tableau Online)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Not Running Notifications</td>
<td>Sends email alerts to data source owners when a client appears to be disconnected from the site.</td>
</tr>
<tr>
<td>Pooling</td>
<td>Distributes live queries and refresh jobs across all clients in Bridge pools. For more information, see Configure and Manage the Bridge Client Pool.</td>
</tr>
<tr>
<td>Private Network Allowlist</td>
<td>Add and manage domains that enable dedicated Bridge pool access to private network data on behalf of Tableau Online.</td>
</tr>
</tbody>
</table>
### Extensions section

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard Extensions</td>
<td>Manage and control dashboard extensions. Dashboard extensions are web applications that run in custom dashboard zones and can interact with the rest of the dashboard. For more information, see &quot;Manage Dashboard Extensions&quot; in Tableau Online Help or Tableau Server Help.</td>
</tr>
<tr>
<td>Analytics Extensions</td>
<td>Enables a set of functions that your users can use to pass expressions to analytics extensions for integration with R and Python. For more information, see &quot;Configure Connection with Analytics Extensions&quot; in Tableau Online Help or Tableau Server Help.</td>
</tr>
<tr>
<td>Tableau Prep Extension</td>
<td>When authoring flows on the web, enables users to apply Einstein Discovery-powered models to their flows to bulk score predictions for their data.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Configure Einstein Discovery Integration in the Tableau Server help.</td>
</tr>
</tbody>
</table>

### Integrations section

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slack Connectivity</td>
<td>Displays connections between a Slack workspace and the Tableau site. When connected, Tableau site users can see their Tableau notifications in the connected Slack workspace.</td>
</tr>
<tr>
<td></td>
<td>In Tableau Online, you can request that the Slack workspace administrator install the Tableau for Slack app, then finalize the connection once installed. For more information, see Integrate Tableau with a Slack workspace.</td>
</tr>
</tbody>
</table>
Analytics Extensions

Enables a set of functions that your users can use to pass expressions to analytics extensions for integration with R and Python. For more information, see "Configure Connection with Analytics Extensions" in Tableau Online Help or Tableau Server Help.

Connected Apps section

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected Apps</td>
<td>Create and manage Tableau connected apps, or explicit direct trust relationships or OAuth 2.0 trust between your Tableau Online site and custom applications and programmatically authorize access to the Tableau REST API on users' behalf using JSON web tokens (JWTs). For more information, see Use Tableau Connected Apps for Application Integration in the Tableau Online Help.</td>
</tr>
</tbody>
</table>

Upload a Custom Logo for your Site

To incorporate brand identity into your site header, you can change the Tableau logo to your own logo.

1. Sign in to Tableau Online as a site administrator.
2. On the site you want to show your logo, click Settings.
3. In the Site Logo section, do either of the following:
   - Drag the image file from your computer to the area indicated on the Settings page.
• Click **Select File** to open a dialog box where you can browse to and select the image file.

The preview area updates to show how your image will look in the space provided in the header.

4. **(Optional)** If your logo doesn’t fit quite right in the available space, and you want to make adjustments outside of Tableau before uploading it, you can do either of the following:

   • Click **Reset to Default** to show the original Tableau logo.

   • Click **Revert** to go back to the last saved settings. This is useful if you already have a custom logo in place but want to try a different one.

5. Click **Save**.
Image file tips

- The recommended image size is 48 x 48 pixels, up to 160 x 160 pixels (the maximum).
- Images that have a transparent background and light colors work best against the near-black background of the Tableau Online site.

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 Online or 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 custom portal guides your users directly to the data they need, while providing ready access to related views and Tableau Online 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?
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.
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 \texttt{:embed-d=y\&:toolbar=n}

Set the Default Start Page for All Users

In a new site, when users sign in to the Tableau Online web authoring environment, they are taken to the Home screen, which displays a role-based welcome banner. Home also displays recent views, favorites, and the site’s most-viewed content. As the administrator, you can change users’ default landing page at the site level. For example, you can show all workbooks, and when the user signs in, they see the workbooks they have access to.

To set the default start page for all users

1. Display the page or filtered view you want to be the default page users see when they sign in to the site.

2. Select your profile icon in the upper right area of the page.

3. To set the start page for all users on a site, click \texttt{Set as Start Page} and \textbf{For Users on this Site}.

User-set start pages and hierarchy

Users can set their own start pages from their profile icon, and can reset their start pages in their account settings (for information, search for “Access Your Profile and Account Settings” in the online Tableau Server Help for your operating system).

If a user sets their own start page, it will override any start page set for the site. The next time that user signs into Tableau Online, they will land on the start page that they’ve set. If neither a user or an administrator has set a start page, users will default to Home.
Change Time Settings

There are a couple of time-related configurations you might make when working with Tableau Online.

Set the site time zone for extracts

The default time zone for extract-based data sources in a site is Coordinated Universal Time (UTC). Site administrators can set a different time zone.

To set the site time zone for extracts:

1. Sign in to Tableau as an administrator.
2. On the site you want to configure, click Settings.
3. In the Site Time Zone for Extracts section, select a time zone and then click Save.

In calculated fields, functions such as NOW() or TODAY() look at the time zone. For more information about Extracts, see Extract Your Data in the Tableau Desktop help.

The timezone setting, in addition to being used for extract-based data sources, also affects internal extracts. For example, when Tableau connects to file-based data sources like text files, an extract is automatically created internally. Similarly, this happens where Tableau uses an internal extract to integrate data from different sources.

Synchronize your computer clock with UTC

Timestamps displayed across your Tableau Online site is in Coordinated Universal Time (UTC) of the pod that your site is deployed to. To ensure the time on your computer matches the time used by your site, you can synchronize your computer’s system clock with UTC using one of the following suggestions:

- If your computer is deployed on Amazon Web Services (AWS), you can synchronize your computer’s system clock using Network Time Protocol (NTP) sources as described in the Keeping Time With Amazon Time Sync Service blog post on the
AWS website.

- If your computer is deployed outside of AWS, you can synchronize your computer’s system clock using one of the National Institute of Standards and Technology (NIST) time servers as described in Set your computer clock via the Internet using tools built into the operating system page on the NIST website.

Security in the Cloud

Tableau understands that data is among the most strategic and important assets an organization has. We put the highest priority on maintaining the security and privacy of our customers’ data. Tableau enterprise-level security features manage operational security, user security, application security, network security, and data security.

To learn more, see the following resources on Tableau’s website (https://www.tableau.com):

- Tableau Online Security in the Cloud white paper.
- Tableau Online tips: A security checklist for publishing data to the cloud

If you sign in to Tableau Online using TableauID credentials, you can use them also to sign in to the Tableau website.

Operational Security

The Tableau Online infrastructure is hosted in a SAS-70 compliant data center that provides numerous controls and safeguards over customer data.

Your data is your own, even when stored in Tableau Online. Only your authorized users have access to data or workbooks stored in Tableau Online—Tableau employees and other Tableau customers do not.

Tableau does have access to and may monitor metrics that have to do with system utilization, account status, and performance.
User Security

The only people who have access to your site and content are the users that your site’s administrators have explicitly added to your site. If a user is no longer authorized in your system, simply remove that person’s user account to revoke access to Tableau Online and your content stored there.

Tableau Online enforces an idle session timeout of 2 hours. This means that users will need to re-authenticate after not using Tableau Online for a period of 2 hours. The idle session timeout value is a system setting that cannot be modified.

Tableau Account

Your Tableau Account provides secure, unified authentication to Tableau’s website and services.

Some of the security features of Tableau Accounts are:

- User sign-in is secured by HTTPS.
- Accounts are locked for a period of time after repeated unsuccessful sign-in attempts.
- Accounts are validated by user email to prove identity.
- Passwords are stored using cryptographic protection. Tableau employees and contractor do not have access to plain-text passwords.
- Multi-factor authentication (MFA) can be enabled for accounts that use Tableau authentication (TableauID).

Tableau Online site administrators have the option of using your organization’s identity provider for added control and convenience of users. For more information, see Authentication.

Roles and Permissions

A role is a set of permissions that is applied to a project, workbook, view, or data source to manage user interaction. A wide range of specific permissions is available for each asset:
Network Security

All communication between users and Tableau Online is encrypted using SSL for secure transmission of data. Tableau Online supports TLS 1.2 and higher. For more information about TLS support, see the Tableau Knowledge Base. A variety of encryption techniques ensure security from browser to server tier to repository and back. In addition, Tableau has many built-in security mechanisms to help prevent spoofing, hijacking, and SQL injection attacks, and it actively tests and responds to new threats with monthly updates.

Application Security

The Tableau Online environment is hosted in a multi-tenant configuration providing separation of users, data, and metadata across customers.

Data Security

Tableau Online eliminates the need to implement VPNs or tunnels into your corporate environment. Many data sources can be captured as extracts and then refreshed on a regular basis. To use automatic refreshes, you need to embed credentials in the connection information for the data source. For Google and Salesforce.com data sources, you can embed credentials in the form of OAuth 2.0 access tokens.

You can define additional security in your workbooks and data sources by adding user and data source filters. Tableau also provides a User Filter capability that can enable row-level data security using the user name, group, or full name of the current user. User filters allow you to set a filter on your data based on the identity of the person viewing the data. For example, the Western Sales Director could see results for sales in the West but not for other regions. You set user filters when you publish workbooks and data sources from Tableau Desktop.

For information on the alternatives you can use to implement row-level security in Tableau, see an Overview of Row-Level Security Options in Tableau.
Data Location

Tableau Online is hosted on Amazon Web Services (AWS) and is structured so that you can choose the region where your site, and its data, is stored. As a new customer, you can select one of the following regions during the site setup process:

<table>
<thead>
<tr>
<th>Territory</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>Asia Pacific</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
</tr>
<tr>
<td></td>
<td>Japan</td>
</tr>
<tr>
<td>Europe</td>
<td>EU West</td>
</tr>
<tr>
<td></td>
<td>Ireland</td>
</tr>
<tr>
<td></td>
<td>Europe West</td>
</tr>
<tr>
<td></td>
<td>UK</td>
</tr>
<tr>
<td>North America</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Quebec</td>
</tr>
<tr>
<td></td>
<td>US-East</td>
</tr>
<tr>
<td></td>
<td>Virginia</td>
</tr>
<tr>
<td></td>
<td>US-West</td>
</tr>
<tr>
<td></td>
<td>Oregon</td>
</tr>
</tbody>
</table>

If needed, you can migrate your existing site to a different region through the site migration process. To request this type of change, contact Tableau Support.

Your site is backed up in the selected region on a regular basis. You can verify your site location by signing in to Tableau Online, noting the host name at the beginning of the URL, and then comparing it to the Site Location column in Tableau Online IP addresses for data provider authorization. For example, URLs that begin with 10ax, 10ay, 10az, us-west-2b correspond to the US West - Oregon region. Data corresponding to a site in the US-West Oregon region is stored and backed up in Oregon.

- To request a new site, fill out this web form.
- For more information about the Tableau Online maintenance schedule, see Tableau Online System Maintenance.

See also

Keep Data Fresh
Tableau Online Site Capacity

Your Tableau Online site comes with capacity to support all your users’ analytic needs. A site’s capacity includes capacity for storage and tasks that need to be performed on the site for extracts, metrics, subscriptions, and flows.

Summary

The following table summarizes the capacity allowances for your site by feature. You can find more capacity information by the features listed below.

<table>
<thead>
<tr>
<th>Capacity Type</th>
<th>Capacity Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage</strong></td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>100 GB</td>
</tr>
<tr>
<td></td>
<td>1 TB with an Advanced Management license.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Advanced Management capacity.</td>
</tr>
<tr>
<td>Individual workbook,</td>
<td>15 GB</td>
</tr>
<tr>
<td>published data source,</td>
<td>25 GB with an Advanced Management license. See Advanced Management capacity.</td>
</tr>
<tr>
<td>or flow size</td>
<td></td>
</tr>
<tr>
<td><strong>Extract refreshes</strong></td>
<td></td>
</tr>
<tr>
<td>Daily refreshes</td>
<td>Up to 8 backgrounder hours per Creator license</td>
</tr>
<tr>
<td>Capacity Type</td>
<td>Capacity Allowance</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Concurrent refreshes</td>
<td>Up to 10 jobs</td>
</tr>
<tr>
<td></td>
<td>Up to 25 jobs with an Advanced Management license. See Advanced Management capacity.</td>
</tr>
<tr>
<td>Individual refresh runtime</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

**Metrics**

<table>
<thead>
<tr>
<th></th>
<th>Daily refreshes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 8 backgrounder hours per Creator license</td>
</tr>
<tr>
<td>Concurrent refreshes</td>
<td>Up to 10 jobs</td>
</tr>
<tr>
<td>Individual runtime</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

**Subscriptions**

<table>
<thead>
<tr>
<th>Subscriptions</th>
<th>Capacity Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent subscriptions</td>
<td>Up to 10 jobs</td>
</tr>
<tr>
<td>Individual subscription runtime</td>
<td>2 hours</td>
</tr>
<tr>
<td>Individual email size</td>
<td>2 MB</td>
</tr>
</tbody>
</table>

**Flows**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent flows</td>
<td>1 per Resource Block</td>
</tr>
<tr>
<td>Individual flow runtime</td>
<td>See Job runtime capacity.</td>
</tr>
<tr>
<td>Flow memory usage size</td>
<td>7.5 GB</td>
</tr>
</tbody>
</table>
Tableau Online Help

<table>
<thead>
<tr>
<th>Capacity Type</th>
<th>Capacity Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visualizations</td>
<td></td>
</tr>
<tr>
<td>Load time</td>
<td>Up to 5 minutes</td>
</tr>
<tr>
<td>Query usage size</td>
<td>20 GB</td>
</tr>
</tbody>
</table>

**Storage capacity**

A Tableau Online site comes with site and individual content storage capacities.

- **Site storage**: A site comes with 100 GB of storage capacity. Workbooks, published data sources, and flows count toward this storage capacity.

- **Individual workbook, published data source, and flow size**: An individual workbook, data source (live or extract), or flow published to your site can have a maximum size of 15 GB.

  **Note**: If your extract data source exceeds 10 GB in size, we recommend that you consider either using live connection to the database or aggregate the data in the extract to reduce its size. Frequently republishing or refreshing large extracts can be time intensive and usually indicates that more efficient data freshness strategies should be considered.

**Visualization capacity**

Each site comes with designated capacity to load and query individual visualizations, also known as views. You can find more information about each capacity type below.

- **Load time**: A site has capacity to spend up to 5 minutes to load a view.

- **Query usage size**: A site has capacity to use no more than 20 GB of memory to query a view that uses an extract data source. The amount of memory needed to query a view can vary depending on the complexity of the data manipulations that Tableau needs to perform to generate the marks in the view.
**Note:** Only queries against extract data sources count toward query usage capacity. Queries against data sources that use live connections to the underlying data do not. However, queries against data sources that use live connections might be subject to other query usage capacity enforced by underlying databases.

Views that exceed one or both capacity types might be canceled to ensure enough system resources are available so that other views on the site can load.

**Tips for optimizing visualization capacity**

Views that exceed visualization capacity can indicate the queries that Tableau must run in order to generate the view might be too complex. In such cases, you can use the following tips to help optimize queries thereby minimizing the time it takes to load views on Tableau Online. Most tips require that you edit the data source or workbook and republish to Tableau Online for changes to take effect.

For more tips, see the Workbook Performance topic in the Tableau Help.

- **Use data source filters:** When you add a filter on a data source, you reduce the amount of data that needs to be generated in the view. Reducing the amount of data can help minimize load times of views. For more information, see Filter Data from Data Sources in the Tableau Help.

- **Use context filters:** Similar to data source filters, context filters reduce the data in the data source but at the sheet level. Context filters work independently of other filters and can significantly reduce the amount of data that needs to be generated in the view. Reducing the amount of data can help minimize load times of views. For more information, see Improve View Performance with Context Filters in the Tableau Help.

- **Decrease date ranges:** As a rule, dates require more computing power than other types of data like numbers and Booleans. If the view contains date filters, you can reduce the date ranges or the number of dates that need to be generated to help minimize the load times of views.

- **Reduce marks:** Because Tableau must calculate the marks in order to generate the...
view, the number of marks can impact how quickly the view can load. There are several ways you can reduce marks, including using some of the filters listed above or using sets to filter, custom SQL to aggregate data, and more. For more information, see Reduce the number of marks in the view.

Job runtime capacity

Job runtime capacity is the period of time that a job, or an instance of a task type, is allowed to run before it's canceled to help protect available system resources. Each site comes with job runtime capacities for the following job types:

- Extract refreshes
- Subscriptions
- Flows
- Metrics

Each extract refresh, subscription, or metrics job type has a maximum runtime of two hours (120 minutes or 7,200 seconds).

**Note about flows:** For sites that don’t have Data Management, the maximum runtime for flows jobs for a site is 60 minutes times the number of creator licenses up to a maximum of 24 hours. If your site has large flows workloads, consider purchasing Data Management to get more capacity. For sites with Data Management, you can run flows for up to 24 hours per day per Resource Block. If you exceed the time limit no new jobs can be started until the next day. Additional capacity for concurrent flow jobs can be purchased. For more information, see Resource Blocks.

**Note about extract refreshes:** If a refresh job reaches its maximum runtime, you see a timeout error. For more information about the error and ways you can modify extracts to keep refresh jobs within the runtime capacity, see Time limit for extract refreshes.

Concurrent jobs capacity

Concurrent jobs capacity is the number of jobs, or instances of a task type that can run at the same time. Each site comes with concurrent capacities for the following job types:
You can find more information about the concurrent jobs capacity for each job type below.

- **Extract refreshes**: A site has the capacity to refresh up to 10 extracts concurrently. Depending on available system resources, refresh jobs can run sequentially or in parallel. Jobs that count toward concurrent refresh capacity include scheduled refreshes, manual refreshes, extract creation, and command line or API calls that trigger refreshes, including appending data incrementally.

- **Subscriptions**: A site has the capacity to run up to 10 subscriptions concurrently. Jobs that count toward concurrent subscriptions capacity include generating emails from subscriptions created through Tableau Online directly or API calls that generate the email subscriptions.

- **Flows**: If licensed with Data Management, a site has a default capacity of 1 concurrent flow job per Resource Block. Resource Blocks support flow jobs. If not licensed with Data Management, a site has a default capacity of 1 concurrent flow job, which is the equivalent of having one resource block. If there are no resource blocks available when a flow job starts, the job goes into a queue to wait for a resource block to be available. Additional capacity for concurrent flow jobs can be purchased. For more information, see Resource Blocks. Each user can have a maximum of 4 active flow web editing sessions at one time. If more sessions are opened, the oldest session will be closed.

- **Metrics**: Each site has the capacity to refresh up to 10 metrics concurrently. For more information about how metrics refresh, see Create and Troubleshoot Metrics.

**Note**: If a site exhausts its concurrent capacity for a job, other jobs that are in the queue remain in a pending state until one or more jobs have completed.
Daily jobs capacity

Daily jobs capacity is the number of shared hours each site can spend per Creator license a day to perform all jobs on the site. A server process, called backgrounder, initiates and performs these jobs. A site with more Creator licenses gets more daily jobs (backgrounder) capacity to meet the needs of a larger site population.

Each site comes with daily jobs (backgrounder) capacity to perform both extract refresh and metric refresh jobs.

For example:

<table>
<thead>
<tr>
<th>If your site has...</th>
<th>multiplied by the default time</th>
<th>Daily jobs capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Creator licenses</td>
<td>8 hours</td>
<td>Up to <strong>80 hours/day</strong></td>
</tr>
<tr>
<td>50 Creator licenses</td>
<td>8 hours</td>
<td>Up to <strong>400 hours/day</strong></td>
</tr>
</tbody>
</table>

Daily jobs capacity resets each day at 24:00:00 UTC (coordinated universal time).

About extract refreshes

Refresh jobs that count toward daily jobs capacity include full and incremental refreshes and extract creation, which can be initiated by scheduled refreshes, manual refreshes, and certain command line or API calls.

Notes:

- As long your site has time remaining in its daily refresh capacity, a refresh job will run regardless of the time it takes for that refresh job to complete.
- Site admins receive email notifications when a site reaches 70%, 90%, and 100% of its daily refresh capacity.
- If a site exhausts its daily refresh capacity, any future extract refreshes are canceled and email notifications are sent to content owners alerting them of the refresh cancellation.
Tips for optimizing extract refreshes capacity

If you're managing an extract-heavy environment, Tableau recommends following some best practices to make the most efficient use of your site capacity.

- **Stop refreshing unused extracts.** One of the best ways to reclaim capacity for your site is to stop automatic refreshes, either through schedules on Tableau Online or through scripts of extracts that aren't being used. For more information about deleting a refresh schedule, see Manage Refresh Tasks.

- **Reduce the frequency of refreshes.** Another method of reclaiming capacity for your site is to reduce the frequency of extract refreshes. For example, instead of refreshing an extract hourly, consider refreshing an extract daily or only during business hours when fresh data is most useful. For more information about changing a refresh schedule, see Manage Refresh Tasks.

- **Use incremental refreshes instead of full refreshes.** To decrease the amount of time an extract takes to refresh, consider performing an incremental refresh of the extract instead a full refresh. For more information, see Schedule Refreshes on Tableau Online.

  **Note:** Changing from a full to an incremental refresh can be done from Tableau Online only if the extract was configured for incremental refresh in Tableau Desktop before the extract was published. For more information about incremental refreshes, see Configure an incremental extract refresh in the Tableau User Help.

- **Use live connections instead of extract connections.** For views, dashboards, and workbooks whose data needs to be updated frequently, consider setting up the data source to use a live connection instead of an extract connection.

- **Optimize the data in the extract.** Improving the performance of an extract can also help reduce the amount of time an extract takes to refresh. There are a number of changes you can make to the extract's data to help its overall performance, such as removing unused fields, using filters to remove unused rows, changing date ranges, etc.
About metric refreshes

Metrics that rely on extract data sources refresh when their extract counterparts refresh and therefore count toward daily job capacity.

Note: Metrics that rely on live data sources refresh every 60 minutes and don’t count toward daily job capacity.

Jobs initiated by command line and API calls

In addition to daily jobs capacity described above, a site comes with designated jobs capacity for command line and API calls.

- **Initiate extract refresh jobs**: A site comes with designated capacity for tabcmd (refreshextracts), REST API (Run Extract Refresh Task), and Tableau Client (Python) library calls to initiate extract refresh jobs. A site allows 20 total calls per one-hour period.

- **Query or cancel jobs**: A site comes with a designated capacity for REST API (Query Job and Cancel Job), and Tableau Client (Python) library calls that query status information for asynchronous jobs, or cancel pending and in-progress jobs. A site allows 20000 calls per 24-hour period.

- **Initiate publish, update, or refresh jobs**: A site comes with designated capacity for tabcmd (publish), REST API (Publish Workbook, Publish Data Source, Update Workbook, Update Data Source, Update Data Source Now), and Tableau Client (Python) library calls that initiate publish, update, or refresh jobs for workbooks and data sources. A site allows 4000 calls per 24-hour period.

Note: If the number of calls exceed the command line or API calls capacity described above, you see one of the following errors: Unknown 429 or ApiCallError: 429000: Too Many Requests – Too many requests for <job type> ‘api.rest.refresh_extracts’. Please retry after 146 second(s).
Monitor capacity

There are a few tools you can use to help you monitor your site’s capacity: Jobs page and Admin views.

Jobs page

The Jobs page gives you detail about the unique instances of backgrounder tasks, called jobs, within the past 24 hours. You can use the jobs page to monitor extract refreshes, subscriptions, and flow jobs.

1. Sign in to Tableau Online using your site admin credentials.

2. In the left navigation pane, click Jobs.

3. From the filter drop-down menu, under Task Type, select the job type you want to monitor.

For more information on the Jobs page, see Managing Background Jobs in Tableau Online topic.

Admin views

Admin views help you monitor different types activity on your site. You can find more capacity usage information, using admin views, for the features listed below.

- **Storage**: You can monitor your site’s storage capacity and check which workbooks, data sources, and flows take up the most space on your site using the “Stats for Space Usage” admin view. Select Site Status > Stats for Space Usage.

  - Next to How Is Space Used on This Site, see the total storage capacity used on your site.

  - Below What Workbooks, Data Sources and Flows Use the Most Space, see a list of your site’s content and their sizes.

For more information on this admin view, see Stats for Space Usage topic.
Tableau Online Help

- **Flows:** You can monitor the performance of flow runs. Select **Site Status > Flow Performance History**. Using the dashboard, under **Flow History**, click on a mark to see details about the flows job.

  For more information about this admin view, see **Performance of Flow Runs** in the Tableau Prep Help.

- **Metrics:** You can monitor your site’s metrics jobs by using the “Background Tasks for Non Extracts” admin view. Select **Site Status > Background Tasks for Non Extracts**, and then from the **Tasks** filter drop-down, select **Update all metrics on a view** check box.

  For more information about this admin view, see **Background Tasks for Non Extracts**.

**Advanced Management capacity**

With Advanced Management, you get the following capacity increases for your site:

- Storage of 1 terabyte
- Maximum file size of 25 gigabytes
- Up to 25 concurrent extract refreshes

For more information about Advanced Management, see **About Tableau Advanced Management** on Tableau Online.

**Tableau Online System Maintenance**

Tableau Online undergoes periodic maintenance to sustain the infrastructure supporting Tableau Online services and deliver enhanced features and functionality. As a Tableau Online administrator, you don’t have to worry about managing updates to your site. But we recommend reviewing the reserved maintenance schedule to plan for scheduled downtime and to avoid service interruptions.

For more information about quarterly releases, see **Tableau Online quarterly releases**.
Maintenance communication

Tableau communicates system maintenance through the Tableau Trust page and notification emails to site administrators.

Tableau Trust notifications

Tableau Trust is where all Tableau Online status updates are posted. Status updates include system maintenance, as well as reported incidents that may affect the use of Tableau Online. You can quickly check the status of your Tableau Online instance by visiting the Tableau Trust page, or by subscribing to Trust to stay informed.

To subscribe to Trust, simply go to https://trust.tableau.com, and click **Subscribe to updates**. You can receive updates by email, SMS message, or RSS notifications whenever Tableau creates, updates, or resolves an incident.

Site Administrator emails

Tableau Online users with the Site Administrator role will automatically receive notification emails about their site. Emails include system maintenance and reported incidents that may affect the use of Tableau Online.

Notification emails will include the date and time, name of the Tableau Online instance, type of maintenance scheduled, impact to users, and estimated time to completion.
Reserved system maintenance schedule

Tableau has reserved system maintenance windows for sustaining the security, availability, and performance of the infrastructure supporting Tableau Online services. The reserved maintenance schedule will help you plan for scheduled downtime and avoid service interruptions to your Online site. While there is a pre-defined window in which maintenance can occur, there may be months when maintenance is not required.

When maintenance is scheduled, we publish the dates and times of the maintenance windows on the Tableau Trust site. For maintenances that impact an entire Tableau Online instance, Trust notifications are sent to subscribers and site administrators via email. Notifications are sent when the maintenance schedule is posted to Trust and 14-days before the maintenance will occur. Trust notifications will also be sent at the start and end of each maintenance and 48 hours prior as a reminder.

In the event that we need to reschedule maintenance, the maintenance record will be updated on the Trust site, and an email will be sent to Trust subscribers.

**Note:** If priority maintenance is required, Trust subscribers and Tableau Online site administrators may be notified less than one week in advance.

Whenever possible, and only as maintenance is necessary, Tableau will schedule system maintenance the **first and third weekends of the calendar month** during the windows listed in the table below. Plan the maintenance activities for your organization (software upgrades, integration changes, etc.) outside of the Tableau system maintenance windows for your instance(s). In extreme circumstances, there may be times when system maintenance is scheduled outside of these windows to maintain system availability, performance, and security of the Tableau Online infrastructure.

<table>
<thead>
<tr>
<th>Reserved System Maintenance Windows</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Region</strong></td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Region</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>United States - West</td>
</tr>
<tr>
<td>United States - East</td>
</tr>
<tr>
<td>Europe - West</td>
</tr>
<tr>
<td>Asia Pacific - Japan</td>
</tr>
<tr>
<td>Asia Pacific - Australia</td>
</tr>
</tbody>
</table>

**Note:** Local maintenance windows use Standard Time. The local time may change +/- 1 hour seasonally during Daylight Savings.
Tableau Online quarterly releases

To ensure our products continue to help people use data to solve problems every day, Tableau is constantly innovating. We ship new features and functionality four times a year, once per quarter.

Release communication

Quarterly releases are communicated through in-product notifications to let you know when your site is scheduled to be upgraded, and then again once the upgrade is complete. Sites can be accessed during the upgrade, meaning that all features and functionality are available to users. There is no downtime associated with quarterly release upgrades.

Quarterly release schedule

Major releases are rolled out across Tableau Online’s worldwide infrastructure over several weeks before upgrading our on-premises software. Because our quarterly releases are rolled out worldwide in sequence, exact dates and times are not pre-announced. Instead, in-product notifications are there to inform users and administrators when releases are upcoming.

You will see an in-product notification approximately two weeks before your site is scheduled to upgrade.
Learn about new features

For more information about the new features on your site, see Coming Soon. The Coming Soon page offers information about upcoming and in-progress Tableau releases. As a Tableau Online customer, you may already have access to the features listed on this page. Broader website updates happen once customers across all of our products can upgrade and take advantage of the new features.

Authentication

Authentication refers to the options for how users can sign in to their Tableau Online site, and how they access it after signing in the first time. Authentication verifies a user’s identity.

Tableau Online supports multiple authentication types, which you can configure on the Authentication page.

In addition to the authentication type you configure for your site, multi-factor authentication (MFA) through your SSO identity provider (IdP) is a Tableau Online requirement beginning February 1, 2022. If your organization doesn’t work directly with an SSO IdP, you can use Tableau with MFA authentication to meet the MFA requirement. For more information, see About multi-factor authentication and Tableau Online below.
Tableau Online Help

- **Tableau**: This is the built-in and default authentication type, requiring no additional configuration steps before you add users. Tableau credentials (also called TableauID) are made up of user name and password, which are stored with Tableau Online. Users enter their credentials directly on the Tableau Online sign-in page. Beginning February 1, 2022, site admins or other users who authenticate using TableauID must have **Tableau with MFA** configured. If Tableau with MFA is not configured, users will be prompted to use Tableau with MFA when attempting to sign in based on the Multi-Factor Authentication (MFA) Enforcement Roadmap.

- **Tableau with MFA**: This authentication type uses a combination of 1) TableauID credentials that are comprised of a user name and password, which are stored with Tableau Online, and 2) after a successful TableauID authentication, the user is prompted to respond to an additional verification method before accessing the site. For more information, see Multi-Factor Authentication and Tableau Online.

- **Google**: If your organization uses Google applications, you can enable Tableau Online to use Google accounts for single sign-on (SSO) with MFA using OpenID Connect. When you enable Google authentication, users are directed to the Google sign-in page to enter their credentials, which are stored by Google.

- **Salesforce**: If your organization uses Salesforce, you can enable Tableau Online to use Salesforce accounts for single sign-on (SSO) with MFA using OpenID Connect. When you enable Salesforce authentication, users are directed to the Salesforce sign-in page to enter their credentials, which are stored and managed in Salesforce. Minimal configuration may be required. For more information, see Salesforce Authentication.

- **SAML**: Another way to use SSO is through SAML. To do this, you use a third-party identity provider (IdP) with MFA, and configure the site to establish a trust relationship with the IdP. When you enable SAML, users are directed to the IdP’s sign-in page, where they enter their SSO credentials, already stored with the IdP.
About multi-factor authentication and Tableau Online

In order to get ahead of the rise and constantly evolving threats that can cripple an organization, MFA authentication will be a Tableau Online requirement beginning February 1, 2022. MFA is an effective tool for enhancing sign-in security and protecting your organization and its data against security threats. For more information, see the Salesforce Multi-Factor Authentication FAQ and Multi-Factor Authentication (MFA) Enforcement Roadmap in the Salesforce Help.

Multi-factor authentication (MFA) is an authentication method to use in conjunction with one of the other authentication methods described above to enhance account security. MFA can be implemented in one of two ways:

- **SSO and MFA (primary method):** To satisfy the MFA requirement, enable MFA with your SSO identity provider (IdP).

- **Tableau with MFA (alternative method):** If you don’t work directly with an SSO IdP, you can instead enable a combination of 1) TableauID credentials, which are stored with Tableau Online, and an additional verification method before you and your users can access the site. For more information, see Multi-Factor Authentication and Tableau Online.

About Google, Salesforce, or SAML

If you enable Google or SAML authentication on your site, you can select which users you want to sign in using external credentials, and which to use Tableau credentials. You can allow TableauID and one external provider on a site, but each user must be set to use one or the other type. You can configure user authentication options on the Users page.

**Important:** In addition to these authentication requirements described above, we recommend that you dedicate a site administrator account that is configured for Tableau with MFA authentication. In the event of an issue with SAML or the IdP, a dedicated Tableau with MFA account helps ensure that you have access to your site.
Allow direct access from Tableau connected clients

By default, after users provide their credentials to sign in to a site, they can subsequently access the Tableau Online site directly from a connected Tableau client. To learn more, see Access Sites from Connected Clients.

**Note:** Optionally, you might need to add *salesforce.com* if MFA with Tableau authentication is enabled for your site and your environment is using proxies that prevent clients from accessing other necessary services.

Salesforce Authentication

If your organization uses Salesforce, you can enable Tableau Online to use Salesforce accounts for single sign-on (SSO) with OpenID Connect. As of Spring 2021, Tableau Online supports Salesforce authentication as a new authentication type. When you enable Salesforce authentication, users are directed to the Salesforce sign-in page to enter their credentials, which are stored and managed by Salesforce. This scenario also supports scenarios where Salesforce federates authentication with another IdP.

Username requirement

The username that is used within your Salesforce Org must match the username field in Tableau Online. Both of these usernames are in email format, though they may not be used as email addresses. Verify that that these attributes match. If the do not, configure the Salesforce authentication type, and then see the section below, Mismatched usernames.

Change and configure authentication type

If your organization already uses Salesforce, then setting the authentication type to Salesforce in Tableau Online is a three-step process:

1. Install the Tableau Online connected app package in Salesforce. To allow users to sign in to Tableau Online from your organization, manage access to your connected app by assigning the appropriate profiles or permission sets. Additionally, set the
connected app to Admin pre-approved. See Manage Other Access Settings for a Connected App.

2. Change to Salesforce authentication in Tableau Online:

   ![Authentication types](tableau-online-help.png)

   - Sign in to your Tableau Online site as a site administrator, and select **Settings > Authentication**.
   - On the Authentication tab, select **Enable an additional authentication method**, and then select **Salesforce**.
   - If you have configured your Salesforce organization to use a custom domain for user sign in, then you will need to configure Tableau Online to redirected users to the sign in page. Click **Edit My Domain...** to enter your Salesforce My Domain. Tableau Online will verify the domain and then add it as a sign-in URL.

3. Add new users (or update any previous users) to use Salesforce as their configured authentication type.
Troubleshooting

Mismatched usernames

If existing users in Tableau Online are using usernames that do not match their corresponding usernames in Salesforce, follow this procedure:

1. Change the existing Tableau Online user to an Unlicensed site role to prevent license consumption.
2. Add the new Tableau Online user for Salesforce authentication, ensuring the username matches the username in your Salesforce organization.
3. If necessary, migrate previous content owned by the old username in Tableau Online to the new user.

Unsuccessful login with OAUTH_APP_BLOCKED in return URL

This issue is surfaced when a user who is configured with Salesforce authentication attempts to sign in and is not redirected. Tableau Online will display a message:

*The sign-in was unsuccessful. Try again.*

*If you continue to get this message, capture the status information below, and send it to Customer Support.*

Additionally, return URL in the user's browser includes the following string:

```
/public/oidc/login?error=OAUTH_APP_BLOCKED&error_description=this+app+is+blocked+by+admin&state=...
```

This indicates that the connected application within Salesforce is being blocked by your organization. Some security conscious Salesforce customers block all connected applications and implement API allowlist functionality that will prevent the connected application from working.

To fix this, ensure that the Tableau Online - Salesforce User Login via OIDC connected application is installed and has the appropriate user profiles and permission sets applied. For more information, see:
Multi-Factor Authentication and Tableau Online

As part of the broader Salesforce ecosystem, we require you, site owners, to configure account security mechanisms for you and your users. The way you can enable account security depends on which technologies are available to you in your organization, such as multi-factor authentication (MFA). MFA authentication will be a Tableau Online requirement beginning February 1, 2022. MFA is an effective tool for enhancing sign-in security and protecting your organization and its data against security threats. For more information, see the Salesforce Multi-Factor Authentication FAQ and Multi-Factor Authentication (MFA) Enforcement Roadmap in the Salesforce Help.

When you enable MFA, we require you do this through your single sign-on (SSO) identity provider (IdP). If you don’t work directly with an IdP, you can enable MFA with Tableau authentication using the Tableau with MFA capability.

Important: If you decide to use Tableau with MFA, review this topic in its entirety, especially Regain site access after being locked out.

User accounts and multi-factor authentication

Multi-factor authentication (MFA) is a secure account authentication method that requires users to prove their identity by providing two or more pieces of information, also known as “factors”, when they sign in to Tableau Online. The first factor is unique information your users know—their user names and passwords. Additional factors are verification methods that users have in their possession, such as an authenticator app.

By enforcing multiple factors when users sign in to Tableau Online, MFA makes it more difficult for common threats like phishing attacks and account takeovers to succeed. MFA is an effective tool for enhancing sign-in security and protecting your organization and its data against security threats.

Primary method - SSO with MFA: If you are currently using your
organization’s SSO IdP to enhance your security with MFA, you should continue to do so. If not, to satisfy the MFA requirement, configure your site to use SSO and enable MFA with your SSO IdP. You can configure your site users to authenticate with Google, Salesforce, or SAML provider.

Alternative method - Tableau with MFA: If you don’t work directly with an SSO IdP, or if your site admins or other users use TableauID, you can satisfy the MFA requirement by enabling MFA with Tableau authentication to secure your user sign-in process until you’re able to transition to a more centralized IdP. This capability enables you and your users to continue signing in to Tableau Online with your TableauID credentials, with an additional step of using a verification method before being successfully authenticated to the site.

Tableau with MFA supports the following verification methods:

- Salesforce Authenticator app
- Time-based one-time passcode (TOTP) authenticator apps, including Google Authenticator, Microsoft Authenticator, and Authy
- Recovery code

To compare supported verification methods and review usage requirements, see Verification Methods for Multi-Factor Authentication topic in Salesforce Help.

Enable MFA with Tableau authentication

If your organization does not work directly with an SSO IdP, you can satisfy the MFA requirement with the default Tableau authentication. For more information, see About multi-factor authentication and Tableau Online.

1. Sign in to Tableau Online using your site admin credentials and go to the Users page.

2. Next to the first user listed, do the following:
1. Click the Actions menu, select Authentication, and then select **Tableau with MFA**.

![Authentication](image)

2. Click **Update** to save changes.

3. Repeat step 2 for each user listed, including site admins.

After users sign in to Tableau Online with their Tableau user name and password, they are prompted to choose a supported verification method—Salesforce Authenticator or other time-based one time passcode (TOTP) authenticator apps. For more information about the user process for registering and managing a verification method, see Register for multi-factor authentication.

**Best practices for site admin accounts**

When enabling MFA for your users, we recommend the following best practices for your site admin accounts:

- **Register a minimum of two verification methods**: For each site admin account, register at least two verification methods to reduce the risk of being locked out of the site. For example, after you have registered a primary verification method, we recommend you add the **Recovery Codes** option to generate a set of recovery codes as backup.

- **Designate at least two site admin accounts to manage users and MFA**: Designate at least two site admin-level accounts (Site Administrator Creator or Site Administrator Explorer) that have permissions to manage users and MFA settings. This can help prevent admin access delays if another admin is locked out of the site.
Manage verification methods

You (and your users) can manage verification methods from your My Account Settings page. On this page, you can add or remove additional verification methods.

About recovery codes - use in emergency situations only

To help reduce the risk of a locked-out scenario, we recommend you (and your users) add the Recovery Codes option as backup after registering for MFA. Recovery codes, to be used in emergency scenarios only, allow you to sign in to Tableau Online if you don't have access to your usual MFA verification methods. If you add the Recovery Codes option, a list of ten one-time use codes are generated for you that you can use to sign in to Tableau Online.

**Important:**

- Because the list of codes are not accessible after you've added the Recover Codes option, immediately copy and store these codes in a safe and secure location so that you can use them in emergency situations.
- Recovery codes should not be used as your primary verification method. Instead, recovery codes should be used in emergency scenarios only when you don't have access to your usual MFA verification methods.

Regain site access after being locked out

**Important:** We strongly recommend that you (and your users) register the Recovery Codes option to help avoid being locked out of your site. Recovery codes should be used in emergency scenarios only.

If you lose all your usual verification methods, contact another site admin to help you regain site access by using the procedure described below. You can use this procedure to enable site access for your users as well.

Reset MFA

To enable site access, reset the MFA verification methods from the user's profile page in Tableau Online.
1. Sign in to Tableau Online as a site admin.
2. Navigate to the Users page and select the user who needs to regain access to the site.
3. On the user’s profile page, click the Settings tab, and then click the **Reset MFA Verifiers** button.

   **Note:** To see the **Reset MFA Verifiers** button, the user’s authentication method must be set to **Tableau with MFA**.

After the MFA verification methods have been reset, contact the user and request they follow the procedure described in Register for multi-factor authentication to register for MFA again.

**Rest MFA as the only site admin**

If you’re the only site admin and you lose all your usual verification methods, you must file a case with Tableau Support. In order to regain access to Tableau Online, Tableau Support must manually confirm your identity and then reset the methods of verification. To help ensure a smooth account recovery process, keep the following in mind:

- **Tableau Support** is available only during regular **business hours** (no weekends) in your region. The hours might vary if you’re a Premium Support customer.

- **Tableau Support** might use information from your TableauID profile (on **Tableau.com**) to validate who you are. Therefore, it’s important to keep your profile information, such as phone number, up to date. For more information about editing your TableauID profile, see the Changing your Name, Title or Email Address in the **Tableau Community** on the Tableau Community site.

To file a Tableau Support case, see the **Submitting a Case from the Webform** in the Tableau knowledge base.

**Access Sites from Connected Clients**

By default, Tableau Online allows users to access their sites directly from a Tableau **client**. It allows this access after the user provides credentials the first time they sign in from the client. A client in this case is a Tableau application or service that can exchange information.
with Tableau Online. Examples of Tableau clients include Tableau Desktop, Tableau Bridge, and Tableau Mobile.

Tableau Online establishes a connected client by creating a secure access token that uniquely identifies a user when the user signs in from the client.

Connected client requirement for Tableau Bridge

The default connected client option must remain enabled for the site to allow Tableau Bridge clients to run unattended and, if enabled, support multi-factor authentication with Tableau authentication. If connected clients are disabled for the site, Bridge can only support Tableau username and password authentication.

Note: If multi-factor authentication (MFA) is enabled with Tableau authentication, Bridge clients must be running Tableau Bridge version 2021.1 and later. For more information about Tableau with MFA, see About multi-factor authentication and Tableau Online.

Opt out of allowing connected clients

Site admins can turn off this functionality, to require users to sign in explicitly each time they visit Tableau Online.

Opting out is recommended if SAML is enabled on your site, and you want to ensure that users do not have access to Tableau Online when they are removed from the IdP’s SAML directory.

1. Sign in to Tableau Online with your site admin credentials.

2. Select Settings, and then select the Authentication tab.

3. Under Connected clients, clear the Let clients automatically connect to this Tableau Online site check box.

If you opt out of connected clients, keep the following points in mind:
Some clients provide a Remember Me check box, which users can select to remember their user name. Users always need to provide their password.

For sites configured for single sign-on using SAML authentication, users have direct access to the site after they sign in the first time. They can do this if they do not sign out explicitly by selecting the Sign Out link.

Remove a user’s connected clients

Site administrators can remove clients (access tokens) associated with a particular user, for example, if the user is no longer a member of the site or is seeing a message about exceeding the maximum number of clients in their account.

1. Select Users, and on the Site Users page, select the link on the user’s display name.
2. On the user’s page, select the Settings tab.
3. In the Connected clients section, remove the appropriate clients.

Users also can go to their own account settings page to remove specific clients.

See also

Sign In to Tableau Online

OAuth Connections

Automate User Provisioning and Group Synchronization through an External Identity Provider

You can automate adding or removing users from Tableau Online or adding or removing members from groups using your Identity Provider (IdP).

Tableau Online IdP user management uses the System for Cross-domain Identity Management (SCIM) standard, an open standard for automating the exchange of user identity information. SCIM allows IdPs to centrally manage user identities, including assigning users
Tableau Online Help

to applications and groups. The IdP uses SCIM to ensure that “downstream” applications are kept in sync with the provisioning assignments set up with the IdP. Managing users in this way improves security and can significantly reduce the manual work that site administrators must do to manage site users and group membership.

In the diagram above, the IdP *pushes* updates to Tableau Online and controls how often Tableau Online’s SCIM endpoints are called to ensure users and groups are appropriately mirrored.

**IdP-specific configuration**

The steps later in this topic provide general information that you can use with your IdP’s documentation to configure SCIM for your Tableau Online site. You can get IdP-specific configuration steps for the following IdPs we support:

- Configure SCIM with Azure Active Directory
- Configure SCIM with Okta
- Configure SCIM with OneLogin

We intend to support additional IdPs as the functionality evolves. If you have questions about future plans, [email our SCIM pre-release team](mailto:).
Prerequisites

To enable SCIM integration with your Tableau Online site, you’ll need the appropriate levels of access:

- Site administrator access to the Tableau Online site
- Ability to modify your IdPs configuration settings for Tableau Online

Additionally, the SCIM functionality requires that you configure your site to support SAML single sign-on. If you haven’t done this, see Enable SAML Authentication on a Site, and then follow your IdP’s documentation to add Tableau Online as an application.

Enable SCIM support with your IdP

Use the following steps to enable SCIM support. To complete this process, you’ll also need the documentation your IdP provides. Look for topics that refer to configuring or enabling a service provider for SCIM provisioning.

**Note:** After enabling SCIM, users and their attributes should be managed through the IdP. Changes made within Tableau Online directly may result in unexpected behavior and overwritten values.

1. Sign in to your Tableau Online site as a site administrator, and select **Settings > Authentication**.

2. On the **Authentication** page in Tableau Online, under **Automatic Provisioning and Group Synchronization (SCIM)**, select the **Enable SCIM** check box.

   This populates the **Base URL** and **Secret** boxes with values you will use in the IdP’s SCIM configuration.
**Important:** The secret token is displayed only immediately after it is generated. If you lose it before you can apply it to your IdP, you can select **Generate New Secret**. In addition, the secret token is tied to the Tableau Online user account of the site administrator who enables SCIM support. If that user’s site role changes or the user is removed from the site, the secret token becomes invalid, and another site administrator must generate a new secret token and apply it to your IdP.

3. Copy the secret token value, and then navigate to your IdP settings. Paste the Tableau Online SCIM secret token in the appropriate field.

4. Copy and paste the **Base URL** shown in the Tableau Online SCIM settings to the appropriate field in your IdP.

5. Follow your IdP’s documentation to provision users and groups after enabling SCIM support.

**Replace a SCIM secret token**

When you need to replace your SCIM (system for cross-domain identity management) secret token, follow the steps below:

1. In Tableau Online, navigate to **Settings > Authorization**.

2. Under Automatic Provisioning and Group Synchronization (SCIM), click **Generate New Secret**.

3. Reconfigure SCIM to use the new secret token.

An administrator can also revoke a secret token that belongs to another user by deleting that user from Tableau Online and then adding them back to the site.
Configure SCIM with Azure Active Directory

You can configure user management through Azure Active Directory, provision groups, and assign Tableau Online site roles.

While you complete the following steps, it will help to have the Microsoft documentation at hand. See the tutorial, Configure Tableau Online for automatic user provisioning.

**Note:** If you have already enabled provisioning for your application and would like to update to use the Tableau SCIM 2.0 endpoint, see the Microsoft article Update a Tableau Online application. If you are setting up provisioning for a new instance of the Tableau Online application, follow the steps below.

Enable SCIM support

Use the following steps to enable SCIM support with Azure Active Directory.

1. The SCIM functionality requires that you configure your site to support SAML single sign-on. If you have not done this, complete the section Add Tableau Online to your Azure AD applications in Configure SAML with Azure Active Directory.

2. After adding Tableau Online from the Azure Marketplace, remain signed in to both the Azure portal and Tableau Online, with the following pages displayed:
   - In Tableau Online, the **Settings > Authentication** page.
   - In the Azure portal, the **Tableau Online** application > **Provisioning** page.

3. On the **Authentication** page in Tableau Online, under **Automatic Provisioning and Group Synchronization (SCIM)**, select the **Enable SCIM** check box.

   This populates the **Base URL** and **Secret** boxes with values you will use in the IdP’s SCIM configuration.
**Important:** The secret token is displayed only immediately after it is generated. If you lose it before you can apply it to your IdP, you can select **Generate New Secret.** In addition, the secret token is tied to the Tableau Online user account of the site administrator who enables SCIM support. If that user’s site role changes or the user is removed from the site, the secret token becomes invalid, and another site administrator must generate a new secret token and apply it to your IdP.

4. Copy the secret token value, and on the **Provisioning** page in your Azure portal, do the following:

   - For **Provisioning Mode**, select **Automatic**.
   - For **Authentication Method**, select **Bearer Authentication**.
   - For **Secret Token**, paste the Tableau Online SCIM secret token you copied earlier.
   - For **Tenant URL**, copy and paste the **Base URL** shown in the Tableau Online SCIM settings.
5. Click **Test Connection** to verify the credentials are working as expected, and then click **Save**.

6. In the **Mappings** section, verify that **Provision Azure Active Directory Groups** and **Provision Azure Active Directory Users** are enabled.

7. Select **Provision Azure Active Directory Groups**, and on the **Attribute Mappings** page, review the attributes synchronized from Azure to Tableau Online. To save any changes, click **Save**.
8. Select **Provision Azure Active Directory Users**, and on the **Attribute Mapping** page, review the attributes synchronized from Azure to Tableau Online. To save any changes, click **Save**.

Assign users and groups to the Tableau Online application

Use the following steps to assign individual users and groups to the Tableau Online application in Azure.

1. From the application page, select **Enterprise Apps > Users and groups**.

2. Click **Add user/group**.

3. On the **Add Assignment** page, select a user or group and assign one of the following site roles: **Creator**, **SiteAdministratorCreator**, **Explorer**, **SiteAdministratorExplorer**, **ExplorerCanPublish**, **Viewer**, or **Unlicensed**.

   You will receive an error if you select a role that is not in the above list. For more information about site roles, see Set Users’ Site Roles.

4. Click **Assign**.
Create groups for site roles

A user can be a member of multiple groups in Azure, but they will only receive the most permissive site role in Tableau Online. For example, if a user is a member of two groups with site roles Viewer and Creator, Tableau will assign the Creator site role.

To keep track of role assignments, we recommend creating role-specific groups in Azure, such as “Tableau - Creator”, “Tableau - Explorer”, etc. You can then use the groups to quickly provision new users for the correct role in Tableau Online.

Site roles are listed below in order from most permissive to least permissive:

- Site Administrator Creator
- Site Administrator Explorer
- Creator
- Explorer (Can Publish)
- Explorer
- Viewer

**Note:** Users and their attributes should be managed through Azure. Changes made within Tableau Online directly may result in unexpected behavior and overwritten values.

Provision users and groups

After you have enabled SCIM support and assigned users and groups to the Tableau Online application in Azure, the next step is to provision users to your Tableau site.

1. On the **Provisioning** page, expand the **Settings** section, and define the users or groups you want to provision to Tableau Online in **Scope**.
2. Toggle **Provisioning Status** to **On**.

3. Click **Save**.

Saving starts the initial synchronization of the users or groups defined in **Scope**. Synchronization occurs approximately every 40 minutes as long as the Azure AD provisioning service runs. To manually provision users outside of the schedule, select **Provision on demand**. For more information about on demand provisioning, see the Microsoft article **On-demand provisioning in Azure Active Directory**.

After provisioning is complete, you should see the users or groups from Azure AD on the **Site Users** page in Tableau Online.

**Change user authentication in Tableau Online**

Provisioned users are assigned the SAML authentication type by default. To change the authentication type for users, use the steps below.

1. In Tableau Online, select **Users**.

2. On the **Site Users** page, select the checkboxes next to the users you want to assign an authentication type.

3. On the **Actions** menu, select **Authentication**.

4. In the Authentication dialog, select the preferred authentication type for the user.

For more information about the different authentication types in Tableau Online, see Authentication.
Configure SCIM with Okta

You can configure user management through Okta, provision groups, and assign Tableau Online site roles. If you’re not yet familiar with Tableau site roles and the capabilities each allows, see Set Users’ Site Roles.

As you complete the following steps, it might help also to have the Okta documentation at hand.

Enable SCIM support

Use the following steps to enable SCIM support with your IdP. See also Notes and known limitations for SCIM support with Okta.

1. The SCIM functionality requires that you configure your site to support SAML single sign-on. If you have not done this, complete the following sections in Configure SAML with Okta:

   - Open the Tableau Online SAML settings
   - Add Tableau Online to your Okta applications

After you finish the steps in these two sections, remain signed in to both the Okta console and Tableau Online, with the following pages displayed:

   - In Tableau Online, the **Settings > Authentication** page.
   - In the Okta Developer Console, **Applications > Tableau Online > Provisioning**.

2. On the **Authentication** page in Tableau Online, under **Automatic Provisioning and Group Synchronization (SCIM)**, select the **Enable SCIM** check box.

   This populates the **Base URL** and **Secret** boxes with values you will use in the IdP’s SCIM configuration.
Important: The secret token is displayed only immediately after it is generated. If you lose it before you can apply it to your IdP, you can select Generate New Secret. In addition, the secret token is tied to the Tableau Online user account of the site administrator who enables SCIM support. If that user’s site role changes or the user is removed from the site, the secret token becomes invalid, and another site administrator must generate a new secret token and apply it to your IdP.

3. Copy the secret token value, and then on the Provisioning page in your Okta administrator console, select API Integration in the Settings column.

4. Select Edit, and then do the following:

- Select the Enable API integration check box.
- For API Token, paste the Tableau Online SCIM secret token you copied in the previous step.
- For Base URL, copy and paste the Base URL shown in the Tableau Online SCIM settings.
Enable group provisioning

Okta allows you to push existing groups to Tableau Online to assign user attributes, such as group or site roles. Once a group is pushed, you can manage group membership in Okta to automatically update the corresponding group in Tableau Online.

**Note:** After enabling SCIM, users and their attributes should be managed through the IdP. Changes made within Tableau Online directly may result in unexpected behavior and overwritten values.

The following steps continue where you left off in the previous section, and they assume you are signed in to the Okta administrator console.

1. On the Application tab, select the Tableau Online application.

2. Select the Push Groups tab.

3. Click Push Groups and select one of the options from the drop-down menu:
   - **Find groups by name:** Select this option to search groups by name.
   - **Find groups by rule:** Select this option to create a search rule that pushes any groups that match the rule.

You can deactivate group push, unlink pushed groups, or push group membership immediately by clicking Active or Inactive in the Push Status column. To delete, deactivate, or activate multiple groups, click Bulk Edit.

For more information, see Enable Group Push in the Okta documentation.

Notes and known limitations for SCIM support with Okta

- In the Okta user assignment settings, the values for **User Name** and **Primary email** must be identical.
You must add a separate Tableau Online Okta app for each site you want to manage using SCIM.

If you want to migrate a site, you will need to re-configure SCIM provisioning for the new site.

When provisioning new users, first name and last name attributes in Okta are not synced to Tableau Online. New users must set those fields when they sign in to Tableau Online for the first time.

You can set a user’s site role (such as Creator, Explorer, or Viewer) in Okta at either the user or the group level. We recommend assigning the site role at the group level. If the user is assigned a site role directly, it will override any group settings.

A user can be a member of many groups. Groups can have different site roles. If a user is assigned groups with different site roles, the user will receive the most permissive site role in Tableau Online. For example, if you choose Viewer and Creator, Tableau will assign the Creator site role.

Site roles are listed below in order from most permissive to least permissive:

- Site Administrator Creator
- Site Administrator Explorer
- Creator
• Explorer (Can Publish)
• Explorer
• Viewer

• You can update the site role attribute for a user in Okta and this change will propagate to Tableau Online. Other attributes, such as User Name and Primary email, cannot be updated. To change these attributes, remove the user, change the attribute, and then add the user again.

• Use of SCIM with Grant License on Sign In is unsupported and may result in incorrectly provisioned site roles for users or groups.

Configure SCIM with OneLogin

You can configure user management through OneLogin, provision groups, and assign Tableau Online site roles. If you’re not yet familiar with Tableau site roles and the capabilities each allows, see Set Users’ Site Roles.

As you complete the following steps, it might help also to have the OneLogin documentation at hand. Start with Introduction to User Provisioning.

Enable SCIM support

Use the following steps to enable SCIM support with your IdP.

**Note:** Remember to click Save in the upper right corner of the OneLogin portal after making configuration changes.

1. The SCIM functionality requires that you configure your site to support SAML single sign-on. If you have not done this yet, complete the following sections in Configure SAML with OneLogin:
Step 1: Open the Tableau Online SAML Settings

Step 2: Add Tableau Online to your OneLogin applications

After you finish the steps in these two sections, remain signed in to both the OneLogin portal and Tableau Online, with the following pages displayed:

- In Tableau Online, the Settings > Authentication page.
- In the OneLogin portal, the Configuration page.

2. On the Authentication page in Tableau Online, under Automatic Provisioning and Group Synchronization (SCIM), select the Enable SCIM check box.

This populates the Base URL and Secret boxes with values you will use in the IdP’s SCIM configuration.

**Important:** The secret token is displayed only immediately after it is generated. If you lose it before you can apply it to your IdP, you can select Generate New Secret. In addition, the secret token is tied to the Tableau Online user account of the site administrator who enables SCIM support. If that user’s site role changes or the user is removed from the site, the secret token becomes invalid, and another site administrator must generate a new secret token and apply it to your IdP.

3. Copy the secret token value, and then on the Configuration page in your OneLogin portal, do the following:

- For API Status, click Enable.
- For SCIM Bearer Token, paste the Tableau Online SCIM secret token you copied earlier.
- For SCIM Base URL, copy and paste the Base URL shown in the Tableau
Online SCIM settings.

4. On the **Provisioning** page:
   - Select **Enable provisioning**.
   - Select **Suspend** for *When users are deleted in OneLogin, or the user’s app access is removed, perform the below action.*

5. Click **Save**.

6. (Optional) On the **Parameters** page, map **SCIM Username** to the **Email** attribute. If
you don’t map SCIM Username to an attribute in email address format, you’ll have to manually populate this field for each user as part of the provisioning process.

An error is displayed when provisioning users if the mapped value doesn’t contain the user email address.

If you want to complete the steps for provisioning users and groups, stay signed in to the OneLogin portal and proceed to the next section.

Provision users and groups

OneLogin gives you a number of ways by which you can assign user attributes such as groups or site roles. You can apply them at the Tableau Online app level, create mapping rules, or apply them manually to individual users.

Before you begin, it's important to note the OneLogin concept of groups operates differently than the Tableau concept of groups. In OneLogin, groups function as security boundaries to apply specific security policies to users. Because of this, users can only belong to one group at a time.

Additionally, OneLogin uses roles as a container for applications that different user cohorts can access. Once you assign users a role, you grant them access to all the applications included in the role. This is similar to the Tableau concept of groups. Users can have multiple roles in OneLogin, which can be mapped to a target application group, such as Tableau Online.

Note: The following steps assume you are signed in to the OneLogin portal and Tableau Online app. These steps provide some Tableau-specific information that you can use with the OneLogin documentation for mapping group and site role attributes to users.

Provision a user

Use the following steps to provision individual users to Tableau Online through the OneLogin portal.
1. Go to the Users tab and select the user you want to provision. This opens the user settings page.

2. From the left navigation menu, select Applications.

3. On the Applications page, click the plus (+) icon to provision the user for your Tableau Online application, and then click Continue.

4. Enter the appropriate Tableau Online site role for the user in the Site Role field. For more information about site roles, see Set Users’ Site Roles.

5. Click Save.

Provision multiple users with OneLogin roles

You can provision multiple users to Tableau Online by assigning roles in OneLogin. Users can be added to roles manually or automatically using mappings.

To add users to a role:

1. Go to Users > Roles, and select an existing role or create a New Role. For more information, see the OneLogin article Roles.

The following example shows the role “Sales” that we’ll use as a group in Tableau Online later on.
2. On the Applications page, assign the role access to the Tableau Online application. This should provision the associated users to the application automatically.

3. On the Users page, you can add users to a role manually by entering their first and last name, or add a mapping to automatically add users to a role based on specific attributes - such as their Active Directory group, for example.

4. After adding users to roles, we recommend you create rules within the application to
assign the appropriate Tableau Online site role based on the OneLogin role. For more information, see the OneLogin article Configure Apps.

In the screenshot below, users with the “Sales” role will be assigned the Creator site role in Tableau Online. Likewise, users with the “Marketing” role will be assigned the Viewer site role.

Add users to existing Tableau Online groups

Import Tableau Online groups into OneLogin and specify the groups you want to be selected by default in the user provisioning dialog.

1. On the Parameters page, click Groups, and select the Include in User Provisioning check box.

2. Go to the Provisioning page, and in the Entitlements section, click Refresh.

   This imports the groups from Tableau Online.

3. Go back to the Parameters page, and then select the groups that you want to show as selected values in the user provisioning dialog.
4. To change group membership, go to the Users page, select a user, and in the Groups section, modify the available and selected values.

You can also create mappings that put users into groups automatically, based on conditions you define. For more information, see the OneLogin article Mappings.

Create groups in Tableau Online from OneLogin

Use the following steps to create Tableau Online groups based on attributes in OneLogin mappings. For example, creating a group in Tableau Online based on user roles.

1. Go to Applications, select the Tableau Online application, and then Rules.

2. On the Rules page, click Add Rule to open the edit mapping window.

3. Under Actions, select Set Groups from the drop-down menu, and then select Map from OneLogin.
The conditions field **with value that matches** uses regular expressions. If you want to create a group in Tableau Online that matches the role name in OneLogin, type \.* in the text field.

Assign Tableau site roles

By default, users are assigned the **Viewer** site role, which occupies a **Viewer** license type.

Whatever method you use in OneLogin to assign site roles, at some point you need to enter the site role name into a text box. For the allowed values you can type, see Valid Tableau site role values below.

**Here are some of the ways you can assign site roles**

For individual users:

1. On the **Users** page, select the user, and then navigate to the **Applications** tab. Select the corresponding Tableau Online application.

2. In the user settings, type the site role name in the **Site Role** text box.

For a set of users:
1. On the Parameters page, click Site Role, and then, for Value, select one of the options for assigning the site role attribute

   For example:

   - If all users have the same site role, select Macro and enter the site role name.
   - If the OneLogin user directory contains the site role, select the corresponding attribute.

2. On the Rules page, create a rule that maps a role to a particular role in Tableau Online.

When you’re done assigning the site role, click Save.

Valid Tableau site role values

On the Provisioning page in your OneLogin portal, the Site Role values you can enter are based on current or legacy license roles.

- **Current license roles** include the following site role values:

  Creator, Explorer, ExplorerCanPublish, ReadOnly, ServerAdministrator, SiteAdministratorExplorer, SiteAdministratorCreator, Unlicensed, or Viewer.

- **Legacy (pre-v2018.1) license types** come with the following site roles:

  Interactor, Publisher, ServerAdministrator, SiteAdministrator, Unlicensed, UnlicensedWithPublish, Viewer, or ViewerWithPublish

See also

To learn the effects of changing user attributes, or how to reset individual user attributes you changed manually, see the OneLogin article Provisioning Attributes: the Effect of Defaults, Rules, and Manual Entry.
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 Online to use an external identity provider (IdP) to authenticate users over SAML 2.0. No user credentials are stored with Tableau Online, and using SAML enables you to add Tableau to your organization’s single sign-on environment.

If you want to use site-specific SAML, you must configure server-wide SAML before you configure individual sites. Server-side SAML does not need to be enabled for site-specific SAML to function, but it must be configured.

User authentication through SAML does not apply to permissions and authorization for Tableau Online content, such as data sources and workbooks. It also does not control access to underlying data that workbooks and data sources connect to.

**Note:** Tableau Online supports both service provider initiated and IdP initiated SAML in browsers and in the Tableau Mobile app. SAML connections from Tableau Desktop must be service provider initiated.

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 Online sign-in page or clicks a published workbook URL.

2. Tableau Online starts the authentication process by redirecting the client to the configured IdP.

3. The IdP requests the user’s username and password from the user. After the user submits valid credentials, the IdP authenticates the user.

4. The IdP returns the successful authentication in the form of a SAML Response to the client. The client passes the SAML Response to Tableau Online.

5. Tableau Online verifies that the username in the SAML Response matches a licensed user stored in the Tableau Server Repository. If a match is verified, then Tableau Online responds to the client with the requested content.

**SAML Requirements for Tableau Online**

Before you configure SAML for Tableau Online, obtain what you need to meet the requirements.
Identity provider (IdP) requirements for Tableau configuration

SAML compatibility notes and requirements

Using SAML SSO in Tableau client applications

Effects of changing authentication type on Tableau Bridge

XML data requirements

Identity provider (IdP) requirements for Tableau configuration

To configure Tableau Online for SAML, you need the following:

- **Administrator access to your Tableau Online site.** You must have administrator access to the Tableau Online site on which you want to enable SAML.

- **List of users who will use SSO to access Tableau Online.** You should gather the email addresses for the users you want to allow single-sign-on access to Tableau Online.

- **IdP account that supports SAML 2.0.** You need an account with an external identity provider. Some examples are PingFederate, SiteMinder, and Open AM. The IdP must support SAML 2.0. You must have administrator access to that account.

- **SHA256 is used as signing algorithm.** As of May 2020, Tableau Online blocks IdP assertions and certificates that are signed with the SHA-1 algorithm.

- **IdP provider that supports import and export of XML metadata.** Although a manually created metadata file might work, Tableau Technical Support cannot assist with generating the file or troubleshooting it.

- **IdP provider that enforces a maximum token age of 24 days or less (2073600 seconds).** If the IdP allows a maximum age of tokens that is a greater length of time than the maximum age setting on Tableau Online (2073600 seconds), then Tableau Online will not recognize the token as valid. In this scenario, users will receive error
The sign-in was unsuccessful. Try again. when attempting to log in to Tableau Online.

Important: In addition to these requirements, we recommend that you dedicate a site administrator account that is always configured for TableauID authentication. In the event of an issue with SAML or the IdP, a dedicated TableauID account ensures that you always have access to your site.

SAML compatibility notes and requirements

- **SP or IdP initiated**: Tableau Online supports SAML authentication that begins at the identity provider (IdP) or service provider (SP).

- **Single Log Out (SLO)**: Tableau Online supports both service provider (SP)-initiated SLO and identity provider (IdP)-initiated SLO.

- **tabcmd and REST API**: To use tabcmd or the REST API, users must sign in to Tableau Online using a TableauID account.

- **Cleartext assertions**: Tableau Online does not support encrypted assertions.

- **Tableau Bridge reconfiguration required**: Tableau Bridge supports SAML authentication, but an authentication change requires reconfiguring the Bridge client. For information, see Effects of changing authentication type on Tableau Bridge.

- **Required signature algorithm**: For all new SAML certificates, Tableau Online requires the SHA256 (or greater) signature algorithm.

- **NameID attribute**: Tableau Online requires the NameID attribute in the SAML response.

Using SAML SSO in Tableau client applications

Tableau Online users with SAML credentials can also sign in to their site from Tableau Desktop or the Tableau Mobile app. For best compatibility, we recommend that the Tableau
client application version matches that of Tableau Online.

Connecting to Tableau Online from Tableau Desktop or Tableau Mobile uses a service provider initiated connection.

Redirecting authenticated users back to Tableau clients

When a user signs in to Tableau Online, Tableau Online sends a SAML request (Auth-nRequest) to the IdP, which includes the Tableau application’s RelayState value. If the user has signed in to Tableau Online from a Tableau client such as Tableau Desktop or Tableau Mobile, it’s important that the RelayState value is returned within the IdP’s SAML response back to Tableau.

When the RelayState value is not returned properly in this scenario, the user is taken to their Tableau Online home page in the web browser, rather than being redirected back to the application they signed in from.

Work with your Identity Provider and internal IT team to confirm that this value will be included as part of the IdP’s SAML response.

Effects of changing authentication type on Tableau Bridge

When you change the site’s authentication type, publishers who use Tableau Bridge for scheduled extract refreshes will need to unlink their Bridge client and re-authenticate using the new method.

Unlinking the Bridge client removes all data sources, so users will also need to set up all of their refresh schedules again. The change in authentication type does not affect Bridge live queries or refreshes that run directly from the Tableau Online site (such as for underlying data in the cloud).

We recommend that you alert Bridge users to changes in their site authentication before you make it. Otherwise, they will become aware through authentication errors they get from the Bridge client, or when the client opens with a blank data source area.
XML data requirements

You configure SAML using XML metadata documents that are generated by Tableau Online and by the IdP. During the authentication process, the IdP and Tableau Online exchange authentication information using these XML documents. If the XML does not meet the requirements, errors can occur when you configure SAML or when users try to sign in.

Tableau Online only supports HTTP POST requests for SAML communications. HTTP Redirect is not supported. In the SAML metadata XML document that is exported by the IdP, the Binding attribute must be set to HTTP-POST.

Enable SAML Authentication on a Site

This topic explains how to enable SAML on the site and select single sign-on users. It also provides steps for switching from SAML to the default TableauID authentication. Before you enable SAML, we recommend that you review the SAML Requirements for Tableau Online, including Effects of changing authentication type on Tableau Bridge.

This topic assumes you are familiar with the information in Authentication and How SAML Authentication Works.

IdP-specific configuration information

The steps in the sections later in this topic provide basic steps that you can use with your IdP’s documentation to configure SAML for your Tableau Online site. You can get IdP-specific configuration steps for the following IdPs:

- Configure SAML with Azure Active Directory
- Configure SAML with OneLogin
- Configure SAML with PingOne
- Configure SAML with Okta
- Configure SAML with Salesforce
Enable SAML

1. Sign in to your Tableau Online site as a site administrator, and select **Settings > Authentication**.

2. On the **Authentication** tab, select **Enable an additional authentication method**, select **SAML**, and then select **Edit connection**.

   ![Authentication settings in Tableau Online](image)

   **Authentication types**
   - **Tableau**: This is the default authentication type for Tableau Sites and is always enabled.
   - **SAML**: Lets you set up an identity provider such as Okta or OneLogin with Tableau Online.
   - **Google**: Lets you set up Google as your users' authentication method.
   - **Salesforce**: Redirects users to login.salesforce.com for authentication.

**SAML configuration steps**

This section takes you through the configuration steps that appear on the **Authentication** page in the Tableau Online web UI. In a self-hosted Tableau Server installation, this page appears only when support for site-specific SAML is enabled at the server level. It is enabled by default in Tableau Online.

**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, or adding an application.

**Step 1: Export metadata from Tableau**
To create the SAML connection between Tableau Online and your IdP, you need to exchange required metadata between the two services. To get metadata from Tableau Online, do either of the following steps. See the IdP’s SAML configuration documentation to confirm the correct option.

- **Select Export metadata** to download an XML file that contains the Tableau Online SAML entity ID, Assertion Consumer Service (ACS) URL, and X.509 certificate.

- **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 Online entity ID, ACS URL, and X.509 certificate in separate locations.

The following image has been edited to show that these settings are the same in Tableau Online and Tableau Server.

![Export metadata from Tableau Online](image)

**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 Online 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 a .xml extension.

Step 4: Import IdP metadata to the Tableau site

On the Authentication page in Tableau Online, 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 Online requires.

Note: Tableau Online requires the NameID attribute in the SAML response. You can provide other attributes to map user names in Tableau Online, but the response message must include the NameID attribute.

- **Email:** (Required) Enter the name of the attribute that stores users’ 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

  Tableau Online Help
name, and then enter the attribute name.

5 Match attributes

Match the attribute names (assertions) in the IdP’s SAML configuration to the corresponding attribute names on Tableau Online. Click Test Connection to fetch available attributes.

<table>
<thead>
<tr>
<th>Tableau Online Attribute</th>
<th>Identity Provider (IdP) Assertion Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>NameID</td>
</tr>
</tbody>
</table>

Email

Enter the name of the IdP assertion that contains the email address sent from the IdP to Tableau Online during the authentication process. The user is authenticated if the IdP email address is an exact match for the user’s email address as stored in Tableau.

<table>
<thead>
<tr>
<th>Display Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter an assertion name for either the first name and last name, or for the full name, depending on how the IdP stores this information. Tableau Online uses these attributes to set the display name.</td>
</tr>
</tbody>
</table>

- **First and last name**
  - First name
  - Last name

- **Full name**
  - Full name

Apply

Step 6: Embedding options

Select the method by which users sign in to embedded views. The options are to open a separate pop-up window that displays the IdP’s sign-in form, or to use an inline frame (iframe).
Caution: Because iframes can be vulnerable to clickjacking attacks, not all IdPs support signing in through an iframe. With clickjacking, the attacker tries to lure users into clicking or entering content. They do this by displaying the page to attack in a transparent layer over an unrelated page. For Tableau Online, an attacker might try to capture user credentials or to get an authenticated user to change settings. For more information, see Clickjacking on the Open Web Application Security Project website.

If your IdP doesn’t support signing in through an iframe, select **Authenticate in a separate pop-up window**.

See also Default authentication type for embedded views

**Step 7: Troubleshooting**

Start with the troubleshooting steps suggested on the Authentication page. If those steps do not resolve the issues, see Troubleshoot SAML.

**Manage users**

Select existing Tableau Online 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.

**Default authentication type for embedded views**

Part of enabling SAML on your site is to specify how users access views embedded in web pages.
• Allow users to choose their authentication type

When you select this, 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.

Tip: 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, Tableau Bridge, Tableau Mobile, and so on.

• Tableau

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.

• SAML

With this option, the way SAML users can sign in to embedded views is determined by the setting you select in step 6 above.

Use TableauID authentication

If a site is configured for SAML, you can change the site settings to require some or all users to sign in using TableauID credentials.

• If you no longer want an identity provider to handle authentication for a site, or require all users to sign in with their TableauID credentials, you can change authentication type at the site level.

• If you want to keep SAML enabled for some users, but require others to use
Tableau ID, you can change authentication type at the user level.

For more information, see Set the User Authentication Type.

Change the site’s authentication type

1. Sign in to Tableau Online as a site administrator and select the site.

2. Select **Settings > Authentication**.

3. For **Authentication Type**, select **Tableau ID**.

After you make the SAML configuration inactive, the metadata and IdP information are preserved, so that if you want to enable it again, you do not need to set up the SAML connection with the IdP again.

See also

Access Sites from Connected Clients

**Configure SAML with Azure Active Directory**

If you’ve configured Microsoft Azure Active Directory (Azure AD) as your SAML identity provider (IdP), use the information in this topic alongside the Azure AD documentation to add Tableau Online to your single sign-on applications. Completing the steps in this topic requires **Azure AD Premium** edition.

**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 general SAML configuration steps, along with the IdP’s documentation.
Open the Tableau Online SAML settings

To use Azure AD with Tableau Online, you configure a custom application in the Azure AD management portal. For this task you’ll need to use information from the Tableau Online SAML settings.

1. Sign in to your Tableau Online site as a site administrator, and select **Settings > Authentication**.

2. On the **Authentication** tab, select **Enable an additional authentication method**, select **SAML**, and then select **Edit connection**.

Add Tableau Online to your Azure AD applications

Taking information from the Tableau Online SAML settings page, review and complete the steps in the following Microsoft Azure articles:

- Quickstart: View enterprise applications
- Tutorial: Azure AD SSO integration with Tableau Online
Configure SAML with AD FS

You can configure Active Directory Federation Services (AD FS) as a SAML identity provider, and add Tableau Online to your supported single sign-on applications. When you integrate AD FS with SAML and Tableau Online, your users can sign in to Tableau Online using their standard network credentials.

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 general SAML configuration steps, along with the IdP’s documentation.

Prerequisites

Before you can configure Tableau Online and SAML with AD FS, your environment must have the following:

- A server running Microsoft Windows Server 2008 R2 (or later) with AD FS 2.0 (or later) and IIS installed.
- We recommend that you secure your AD FS server (for example, using a reverse proxy). When your AD FS server is accessible from outside your firewall, Tableau Online 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 Online as a site administrator.

Step 1: Export metadata from Tableau Online

1. Sign in to Tableau Online as a site administrator.

   If you have more than one site for Tableau Online, select the site for which you want to enable SAML in the sites drop-down.

2. Select Settings > Authentication.
3. On the Authentication tab, select Enable an additional authentication method, select SAML, and then click Edit Connection.

4. Under step 1, Export metadata from Tableau Online, click Export metadata to download an XML file that contains the Tableau Online SAML entity ID, Assertion Consumer Service (ACS) URL, and X.509 certificate.

Step 2: Configure AD FS to accept sign-in requests from Tableau Online

Configuring AD FS to accept Tableau Online sign-in requests is a multi-step process, starting with importing the Tableau Online XML metadata file to AD FS.

1. Do one of the following to open the Add Relying Party Trust Wizard:

   **Windows Server 2008 R2:**
   
   a. Select Start menu > Administrative Tools > AD FS 2.0.
   
   b. 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:**
a. Open **Server Manager**, and then on the **Tools** menu, click **AD FS Management**.

b. In **AD FS Management**, on the **Action** menu, click **Add Relying Party Trust**.

2. In the **Add Relying Party Trust Wizard**, click **Start**.

3. On the **Select Data Source** page, select **Import data about the relying party from a file**, and then click **Browse** to locate your Tableau Online XML metadata file. By default, this file is named **samlspmetadatametadata.xml**.

4. Click **Next**, and on the **Specify Display Name** page, type a name and description for the relying party trust in the **Display name** and **Notes** boxes.

5. Click **Next** to skip the **Configure Multi-factor Authentication Now** page.

6. Click **Next** to skip the **Choose Issuance Authorization Rules** page.

7. Click **Next** to skip the **Ready to Add Trust** page.

8. 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**.

Next, you’ll work in the **Edit Claim Rules** dialog, to add a rule that makes sure the assertions sent by AD FS match the assertions Tableau Online expects. At a minimum, Tableau Online needs an email address. However, including first and last names in addition to email will ensure the user names displayed in Tableau Online are the same as those in your AD account.

1. In the **Edit Claim Rules** dialog box, click **Add Rule**.

2. On the **Choose Rule Type** page, for **Claim rule template**, select **Send LDAP Attributes as Claims**, and then click **Next**.

3. On the **Configure Claim Rule** page, for **Claim rule name**, enter a name for the rule that makes sense to you.

4. For **Attribute store**, select **Active Directory**, complete the mapping as shown
Tableau Online Help

below, and then click **Finish**.

The mapping is case sensitive and requires exact spelling, so double-check your entries. The table here shows common attributes and claim mappings. Verify attributes with your specific Active Directory configuration.

**Note:** Tableau Online requires the **NameID** attribute in the SAML response. You can provide other attributes to map user names in Tableau Online, but the response message must include the **NameID** attribute.

<table>
<thead>
<tr>
<th>LDAP Attribute</th>
<th>Outgoing Claim Type</th>
</tr>
</thead>
<tbody>
<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>

If you are running AD FS 2016 or later, then you must add a rule to pass through all claim values. If you are running an older version of AD FS, skip to the next procedure to export AD FS metadata.

1. Click **Add Rule**.
2. Under **Claim rule template**, choose **Pass Through or Filter an Incoming Claim**.
3. Under **Claim rule name**, enter Windows.
4. On the **Edit Rule - Windows** pop-up:
   - Under **Incoming claim type**, select **Windows account name**.
   - Select **Pass through all claim values**.
   - Click **OK**.

Now you will export AD FS metadata that you’ll import to Tableau Online later. You will also make sure the metadata is configured and encoded properly for Tableau Online, and verify other AD FS requirements for your SAML configuration.
1. Export AD FS Federation metadata to an XML file, and then download the file from https://<adfs server name>/FederationMetadata/2007-06/FederationMetadata.xml.

2. Open the metadata file in a text editor like Sublime Text or Notepad++, and verify that it is correctly encoded as UTF-8 without BOM.

   If the file shows some other encoding type, save it from the text editor with the correct encoding.

3. Verify that AD FS uses forms-based authentication. Sign-ins are performed in 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.

4. Configure an additional AD FS relying party identifier. This allows your system to work around any AD FS issues 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 created for Tableau Online earlier, and click Properties.

   b. On the Identifiers tab, in the Relying party identifier box, enter https://<tableauservername>/public/sp/metadata and then click Add.

   **Windows Server 2012 R2:**
Tableau Online Help

a. In AD FS Management, in the Relying Party Trusts list, right-click on the relying party you created for Tableau Online earlier, and click Properties.

b. On the Identifiers tab, in the Relying party identifier box, enter https://<tableauservername/public/sp/metadata and then click Add.

Note: AD FS can be used with Tableau Server for a single relying party to the same instance. AD FS cannot be used for multiple relying parties to the same instance, for example, multiple site-SAML sites or server-wide and site SAML configurations.

Step 3: Import the AD FS metadata to Tableau Online

1. In Tableau Online, go back to the Settings > Authentication page.

2. Under 4 Import metadata file into Tableau Online, in the IdP metadata file box, specify the name of the file you exported from AD FS (FederationMetadata.xml).


You’ve already created a claim rule in AD FS to match the attribute names to what Tableau Online expects.

4. Under 6. Manage users, do one of the following:

   - If you haven’t added Tableau Online users yet, click Add users.

     You can then add users manually using the form, or import a CSV file that contains user information.

   - If you have added users to your site already, click Select users.
Select the check box next to the users you want to allow to use SAML sign-in, and then on the Actions menu select Authentication. Change the authentication method to SAML.

![Authentication](image)

5. (Optional) Test SAML sign in, using the following steps:
   
   a. Open a private window or session in your web 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 https://online.tableau.com.
      
   b. Enter the email address of the user. Tableau Online will remove the password field if the user’s account is correctly set up for SAML authentication.
      
   c. Click Sign in, and on the AD FS sign-in page, enter your AD credentials.

      After you’re authenticated AD FS redirects you to Tableau Online.

Your Tableau Online site is now ready for users to sign in using AD FS and SAML. They still navigate to https://online.tableau.com, but after entering their email address, the page redirects to the AD FS sign-in page (as in the optional test step above), and prompts users for their AD credentials.
Note: If you get errors testing SAML sign-in, in step 7. Troubleshooting single sign-on (SSO) of the Tableau Online SAML configuration steps, click Download log file, and use the information there to troubleshoot the error.

Additional requirements and tips

- After you set up SAML integration between AD FS and Tableau Online, you must update Tableau Online to reflect particular user changes you make in Active Directory. For example, adding or removing users.

You can add users automatically or manually:

  - **To add users automatically:** Create a script (using PowerShell, Python, or batch file) to push AD changes to Tableau Online. The script can use tabcmd or the REST API to interact with Tableau Online.

  - **To add users manually:** Sign in to the Tableau Online web UI, go to the *Users* page, click *Add Users*, and enter users’ email addresses or upload a CSV file that contains their information.

Note: If you want to remove a user but keep content assets they own, change the owner of the content before you remove the user. Deleting a user also deletes content they own.

- In Tableau Online, a user’s email address is their unique identifier. As described in the steps for configuring AD FS to accept sign-in requests from Tableau Online, users’ Tableau Online email addresses must match the email address stored in AD.

- In Step 2: Configure AD FS to accept sign-in requests from Tableau Online, you added a claim rule in AD FS to match the first name, last name, and email address attributes between AD FS and Tableau Online. Alternatively, you can use step 5. **Match attributes** in Tableau Online to do the same.
Configure SAML with OneLogin

If you use OneLogin as your SAML identity provider (IdP), you can use the information in this topic to set up SAML authentication for your Tableau Online site.

These steps assume that you have permissions for modifying your organization’s OneLogin portal, and you are comfortable reading XML and pasting values into attributes.

**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 general SAML configuration steps, along with the IdP’s documentation.

Step 1: Open the Tableau Online SAML Settings

1. Sign in to your Tableau Online site as a site admin, and select **Settings > Authentication**.

2. On the Authentication tab, select **Enable an additional authentication method**, select **SAML**, and then select **Edit connection**.
Step 2: Add Tableau Online to your OneLogin applications

1. Open a new browser tab or window, and sign in to your OneLogin admin portal and do the following:
   a. On the Applications page, select Add Apps. Search for Tableau, and in the results, select Tableau Online SSO. In this area you configure the SAML connection.

   **Note:** The Tableau Online SSO option for OneLogin does not work with Tableau Server.
   b. On the Info page, set up your portal preferences. If you have more than one Tableau Online site, include the site name in the Display Name field to help users know which site to select.

2. On the Configuration page in the OneLogin admin portal, you will use information from 1 Export metadata from Tableau Online in the Tableau Online Authentication.
   a. For Consumer URL, on Tableau Online’s Authentication page, select and copy the Assertion Consumer Service URL (ACS).

   Return to OneLogin and paste the URL into the Consumer URL field.
   b. For Audience, copy and paste the Tableau Online Entity ID from Tableau
Online’s Authentication page.

3. On the SSO page in the Onelogin admin portal, select SHA-256 for the SAML Signature Algorithm.

4. On the Parameters page in the Onelogin admin portal, make sure the values appear as follows:

<table>
<thead>
<tr>
<th>Tableau Online field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>Email</td>
</tr>
<tr>
<td>Email (attribute)</td>
<td>Email</td>
</tr>
<tr>
<td>First Name</td>
<td>First Name</td>
</tr>
</tbody>
</table>
Tableau Online Help

<table>
<thead>
<tr>
<th>Tableau Online field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Name</td>
<td>Last Name</td>
</tr>
</tbody>
</table>

Step 3: Configure OneLogin metadata for Tableau Online

For the following steps, you'll find and configure OneLogin information for Tableau Online to complete the SAML configuration.

1. While still in the OneLogin admin portal, on the SSO page, select and copy the URI shown in the SLO Endpoint (HTTP) field.

   **Note:** Although the label indicates HTTP, the URI provided is an https address, because the SLO (single logout) endpoint uses SSL/TLS encryption.

2. On the same page, select **More Actions > SAML Metadata**, and save the file to your computer.

   You will import this file to Tableau Online in the next section.

Step 4: Complete the SAML configuration

1. On Tableau Online's **Authentication** page, do the following:

   a. For **4 Import metadata file into Tableau Online**, import the OneLogin metadata file you saved in the previous section.

      **Important:** If you encounter any issues with uploading the OneLogin metadata file, consider using a non-default certificate with OneLogin. To create a new certificate, from the Onelogin admin portal, select **Security > Certificates**. If you create a new certificate, ensure the Tableau Online application in OneLogin uses this new certificate.

   b. For **5 Match attributes**, set the values in the **IdP Assertion Name column** as follows:
Email: Email
Select the First name, Last name radio button.
First name: FirstName
Last name: LastName

5 Match attributes

Match the attribute names (assertions) in the IdP’s SAML configuration to the corresponding attribute names on Tableau Online. Click Test Connection to fetch available attributes.

<table>
<thead>
<tr>
<th>Tableau Online Attribute</th>
<th>Identity Provider (IdP) Assertion Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>NameID</td>
</tr>
</tbody>
</table>

Display Name

Enter an assertion name for either the first name and last name, or for the full name, depending on how the IdP stores this information. Tableau Online uses these attributes to set the display name.

- First and last name
- Full name

First name: FirstName
Last name: LastName
Full name: FullName

Apply

c. For 6 Embedding options, select the experience you want to enable when users access embedded content. For more information, see the (Optional)
Enable iFrame embedding section below

d. Skip **Troubleshooting single sign-on (SSO)** for now.

2. Finally, **add SAML users** to your site and test the connection.

**(Optional) Enable iFrame embedding**

When you enable SAML on your site, you need to specify how users sign in to access views embedded in web pages. These steps configure OneLogin to allow your OneLogin dashboard to be embedded into an inline frame (iFrame) on another site. 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 Online 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 Online, 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** on the Open Web Application Security Project website.

1. Open a new browser tab or window, and sign in to your OneLogin admin portal.

2. On the **Settings** menu, click **Account Settings**.

3. On the **Basic** page, in **Framing Protection**, select the **Disable Framing Protection (X-Frame-Options)** check box.
Configure SAML with PingOne

If you use PingOne as your SAML identity provider (IdP), you can use the information in this topic to set up SAML authentication for your Tableau Online site.

**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 general SAML configuration steps, along with the IdP’s documentation.

Get the Tableau Online metadata

1. Sign in to your Tableau Online site as a site administrator, and select **Settings > Authentication**.

2. On the Authentication tab, select **Enable an additional authentication method > SAML**.

3. In Step 1, click **Export metadata** and save the metadata file to your computer.
Configure the PingOne connection

1. Sign in to your PingOne account, and click the Applications tab.

2. In the Application Catalog search for Tableau Online.

3. On the Tableau Online item, click the arrow to expand the item, and then click Setup.

4. On the 1. SSO Instructions page, click Continue to Next Step.

5. On the 2. Configure your connection page, for Upload Metadata, click Select File, and upload the metadata file you saved from Tableau Online. Click Continue to Next Step.

6. In the table on the 3. Attribute Mapping page, map attributes as follows:
<table>
<thead>
<tr>
<th>Application Attribute</th>
<th>Identity Bridge Attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td>email</td>
<td>Email</td>
</tr>
<tr>
<td>firstName</td>
<td>First Name</td>
</tr>
<tr>
<td>lastName</td>
<td>Last Name</td>
</tr>
</tbody>
</table>

You can ignore the other settings in the table.

Click **Continue to Next Step**.

7. **On 4. PingOne App Customization**, consider adding your Tableau Online site name in the **Name** field. This is not required.

Click **Save & Publish**.

8. **On 5. Review Setup**, after reviewing the information you provided, click the **Download** link next to **SAML Metadata**, and save the metadata file to your computer.
Support for single logout

When you import the Tableau Online metadata as part of the PingOne SAML configuration, the certificate embedded in the metadata is not applied to the IdP application definition. This can cause the following error when people sign out of the SAML site:

*It looks like the signing certificate has not been configured.*
Configure the certificate for the IdP

To resolve the sign-out error, you can download the certificate from Tableau Online, convert it from DER encoded to Base-64 encoded, and then upload it to PingOne.

These steps for converting the certificate are specific to Windows.

1. Return to the Settings > Authentication page in your Tableau Online site, and make sure the Single sign-on with SAML box is checked.

2. In Step 1, Export metadata file, click Download signing and encryption certificate and save the .cer file to your computer.

3. Double-click the file you downloaded, click Open.

4. In the Certificate dialog box, select the Details tab and click Copy to File.

5. In the Certificate Export Wizard, do the following:
   a. Click Next on the opening screen, and then select Base-64 encoded X.590 (.CER).
   b. Click Next, and specify the name and location of the file you are exporting.
   c. Click Next, review the summary information, and then click Finish.

6. In your PingOne account, return to the application setup pages for Tableau Online.

7. In Step 2. Configure your connection, for Verification Certificate, click Choose
File, and upload the new .cer file you created.

Complete the Tableau Online site configuration

Complete the following steps after you configure your PingOne account and download the SAML metadata file from PingOne, as described in Configure the PingOne connection earlier in this topic.

1. Return to the Settings > Authentication page in your Tableau Online site.

2. For SAML configuration step 4, for IdP metadata file, click Browse and import the metadata file you downloaded from your PingOne account.

3. Continue to Step 5: Match attributes, and complete the remaining steps as described.

Configure SAML with Okta

If you use Okta as your SAML identity provider (IdP), you can use the information in this topic to set up SAML authentication for your Tableau Online site.
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 general SAML configuration steps, along with the IdP’s documentation.

Open the Tableau Online SAML settings

To configure the Okta application, you will need to use information in the Tableau Online SAML settings.

1. Sign in to your Tableau Online site as a site administrator, and select Settings > Authentication.

2. On the Authentication tab, select Enable an additional authentication method, select SAML, and then select Edit connection.

Add Tableau Online to your Okta applications

1. Open a new browser tab or window, and sign in to your Okta administrator console.

2. On the Applications tab, click the Add Application button. Search for Tableau,
and then add the Tableau Online application.

This opens the **General Settings** tab.

3. (Optional) If you have more than one Tableau Online site, include the site name in the **Application label** field, to help users know which site to select when they sign in.

4. Click **Done** to open the **Assignments** tab.

5. Click **Assign > Assign to People** and click the **Assign** button beside each user you want to approve for single sign-on access to Tableau Online.

6. Click **Done**. Make sure users’ email addresses appear in the **Username** field.

7. Select the **Sign On** tab. In the Settings section, click **Edit**.

8. Switch to the tab or window where you opened the Tableau Online SAML configuration settings, and in Step 1 of those settings, select and copy the **Tableau Online entity ID**.

   **Note:** The Tableau Online SAML configuration settings appear in a different order than on the Okta settings page. To prevent SAML authentication issues, make sure that the **Tableau Online entity ID** and **Assertion Consumer Service (ACS) URL** are entered into the correct fields in Okta.

9. Return to the Okta admin console general settings, and paste the URL into the corresponding field.

10. Repeat the previous two steps for the **Assertion Consumer Service (ACS) URL**. Click **Save**.

11. Right-click **Identity Provider Metadata** and click **Save link as** to download the metadata XML file.

12. Click **View Setup Instructions** and complete the steps to import the IdP metadata,
provide the IdP entity ID and SSO service URL, and match email and display name attributes. Switch to the tab or window where you opened the Tableau Online SAML configuration settings. Note: When importing the Okta metadata file into Tableau Online, it might be necessary to refresh the page after clicking **Apply** to see the changes.

**(Optional) Enable iFrame embedding**

When you enable SAML on your site, you need to specify how users sign in to access views embedded in web pages. These steps configure Okta to allow authentication using an inline frame (iFrame) for embedded views. 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.

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**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 Online, 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://owasp.org/www-community/security risks/clickjacking) on the Open Web Application Security Project website.

1. Open a new browser tab or window, and sign in to your Okta administrator console.

2. On the **Home** page, click **Admin** to open the **Administrator Dashboard**.

3. On the **Settings** menu, click **Customization**.

4. Under **iFrame Embedding**, select **Allow iFrame embedding**.
Add users to the SAML-enabled Tableau site

1. After you complete the Okta configuration steps, return to your Tableau Online site.

2. Complete the SAML connection by adding the users you assigned in the Okta admin console to Tableau Online.

   6 Select Users

   Specify which users can sign in with SAML
   View Users - select users from your Tableau Online user list
   Add Users - type email addresses of new users

Configure SAML with Salesforce

If you’ve configured Salesforce as your SAML identity provider (IdP), use the information in this topic alongside the Salesforce documentation to add Tableau Online to your single sign-on applications.

Open the Tableau Online SAML settings

To configure the Salesforce application, you will need to use information in the Tableau Online SAML settings.

1. Sign in to your Tableau Online site as a site administrator, and select Settings > Authentication.

2. On the Authentication tab, select Enable an additional authentication method,
select SAML, and then select Edit connection.

<table>
<thead>
<tr>
<th>General</th>
<th>Authentication</th>
<th>Bridge</th>
<th>Extensions</th>
<th>Integrations</th>
</tr>
</thead>
</table>

**Authentication types**
- Set sign-in options for users accessing Tableau Online. Learn more
  - Tableau
    - This is the default authentication type for Tableau Sites and is always enabled.
  - Enable an additional authentication method
    - Google
      - Lets you set OpenID as your users' authentication method.
    - Salesforce
      - Redirects users to login.salesforce.com for authentication.
    - Edit My Domain...
      - Let you set up an identity provider such as Okta or OneLogin with Tableau Online.
    - Edit Connection

Configure SSO from Salesforce to Tableau Online

See the Salesforce documentation, Configure SSO from Salesforce to Tableau Online.

Add users to the SAML-enabled Tableau site

1. After you complete the Salesforce configuration steps, return to your Tableau Online site.

2. Complete the SAML connection by adding the users you assigned in the Salesforce Application Profile Assignment page to Tableau Online. On the Authentication page, scroll down to Manage users to add or select users.

Configure SAML for Tableau Viz Lightning Web Component

Tableau provides a Lightning Web Component (LWC) for embedding a Tableau visualization within a Salesforce Lightning page.

This topic describes how to enable a SSO experience for embedded Tableau visualizations in a Salesforce Lightning page. SSO for the Tableau Viz LWC scenario requires SAML con-
The SAML IdP used for Tableau authentication must be either the Salesforce IdP or same IdP that is used for your Salesforce instance.

In this scenario, Salesforce administrators can drag-and-drop Tableau Viz LWC into the Lightning page to embed a visualization. Any view that is available to them on Tableau Online can be displayed in the dashboard by entering the embedded URL to the view.

When single sign-on (SSO) is configured for Tableau Viz LWC on Tableau Online, the user experience is seamless: after the user signs into Salesforce, embedded Tableau views will work without further authentication to Tableau Online.

When SSO is not configured, then users will need to reauthenticate with Tableau Online to view embedded visualizations from Tableau Online.

**Note:** Users configured with Salesforce Authentication will need to reauthenticate with Tableau Online to view embedded visualizations in Tableau Online.

**Requirements**

- The SAML IdP used for Tableau authentication must be either the Salesforce IdP or same IdP that is used for your Salesforce instance.
- SAML must be configured on Tableau Online. See Enable SAML Authentication on a Site.
- SAML must be configured for Salesforce.
- Install the Tableau Viz Lightening Web Component. See [Embed Tableau Views into Salesforce](https://help.tableau.com/current_versions/latest/tableau_viz_lightening_web_component_user_guide/).

**Configuring the authentication workflow**

You may need to make additional configurations to optimize the sign-in experience for users who access Lightning with embedded Tableau views.

If a seamless authentication user experience is important, then you will need to make some additional configurations. In this context, “seamless” means that users who access the Salesforce Lightning page where Tableau Viz LWC SSO has been enabled, will not be required to
perform any action to view the embedded Tableau view. In the seamless scenario, if the user is logged into Salesforce, then embedded Tableau views will be displayed with no additional user action. This scenario is enabled by in-frame authentication.

For a seamless user experience you will need to enable in-frame authentication on Tableau Online and at your IdP. The sections below describe how to configure in-frame authentication.

On the other hand, there are scenarios where users are interacting with the Lightning page that will require them to click a “Sign in” button to view the embedded Tableau view. This scenario, where a user must take another action to view the embedded Tableau view, is called pop-up authentication.

Pop-up authentication is the default user experience if you do not enable in-frame authentication.

Enable in-frame authentication on Tableau Online

Before you enable in-frame authentication on Tableau Online, you must have already configured and enabled SAML.

1. Sign in to your Tableau Online site as a site administrator, and select Settings > Authentication.

2. On the Authentication tab, select Enable an additional authentication method, select SAML, and then select Edit connection.
3. Scroll down to **Embedding options** and select **Authenticate using an inline frame**.

**Embedding options**

Choose how to authenticate users who are accessing embedded views.

- Authenticate in a separate pop-up window
- Authenticate using an inline frame (less secure; not supported by all IdPs)

---

**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 Online, 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](#) on the Open Web Application Security Project website.

---

**Enable in-frame authentication with your SAML IdP**

As described above, a seamless authentication user experience with Salesforce Mobile requires IdP support for in-frame authentication. This functionality may also be referred to as “iframe embedding” or “framing protection” at IdPs.

**Salesforce safelist domains**

In some cases, IdPs only allow enabling in-frame authentication by domain. In those cases, set the following Salesforce wildcard domains when you enable in-frame authentication:

- *.force
- *.visualforce
Salesforce IdP

Salesforce IdP supports in-frame authentication by default. You do not need to enable or configure in-frame authentication in the Salesforce configuration. However, you must configure Tableau Online for in-frame authentication as described above.

Okta IdP

See Embed Okta in an iframe, in the Okta Help Center topic, General customization options.

Ping IdP

See the Ping support topic, How to Disable the "X-Frame-Options=SAMEORIGIN" Header in PingFederate.

OneLogin IdP

See Framing protection, in the OneLogin Knowledge Base article, Account Settings for Account Owners.

ADFS and Azure AD IdP

Microsoft has blocked all in-frame authentication and it cannot be enabled. Instead, Microsoft only supports pop-up authentication in a second window. As a result, pop up behavior can be blocked by some browsers, which will require users to accept pop ups for the force.com and visualforce.com sites.

Salesforce Mobile App

If your users primarily interact with Lightning on the Salesforce Mobile App, then you should be aware of the following scenarios:

- The Salesforce Mobile App requires that you configure SSO/SAML to view embedded Tableau.
- The Salesforce Mobile App requires in-frame authentication. Pop-up authentication does not work. Instead, users on the Salesforce Mobile App will see the Tableau sign-in button but will not be able to sign to Tableau.
Troubleshoot SAML

This topic provides information about resolving issues that can occur when you configure SAML authentication.

Required assertions and metadata do not map correctly

Most issues occur because metadata that you import from the IdP, or assertion names that you enter, do not match the corresponding IdP attributes. To troubleshoot SAML issues, start by making sure the information shown in Steps 1–5 of the Authentication page matches the IdP’s SAML configuration settings.

Tableau Online requires the IdP assertion that contains user email address. In addition to checking Steps 1–5, make sure that users’ email addresses match between Tableau Online and the IdP.

Identity provider does not display sign-in page

A user provides his or her user name on the Tableau Online sign-in page, Tableau Online redirects the request to the identity provider (IdP), but the IdP does not return its SAML sign-in page. The IdP can fail to return the sign-in page for any of the following reasons:

- SSO service URL is not valid.

  When you import the IdP metadata, make sure the SSO Service URL field shows the correct URL.

- The IdP does not recognize the authentication request received.

  For example, the Tableau Online entity ID may be incorrect. This can occur if SAML configuration settings on the Authentication page have become corrupted or inadvertently changed.
To resolve the issue, repeat Steps 3–4 of the SAML configuration:

1. Sign in to your IdP account and export the IdP metadata
2. Sign in to Tableau Online, display the **Authentication** page, and in Step 4, re-import the metadata.

**Nothing happens after IdP sign-in**

If a user provides incorrect credentials on the IdP’s sign-in page, or if the user is not authorized to use SAML, some IdPs will not return control to Tableau Online when authentication fails.

In Tableau Online, on the **Users** page, you can see whether a user is authorized for SAML authentication.

<table>
<thead>
<tr>
<th>Full Name</th>
<th>Username</th>
<th>Site Role</th>
<th>Groups</th>
<th>Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMLUser1</td>
<td><a href="mailto:sami-user1@email.com">sami-user1@email.com</a></td>
<td>Site Administrator</td>
<td>1</td>
<td>Single sign-on</td>
</tr>
<tr>
<td>SAMLUser2</td>
<td><a href="mailto:sami-user2@email.com">sami-user2@email.com</a></td>
<td>Interactor</td>
<td>1</td>
<td>TableauID</td>
</tr>
</tbody>
</table>

**Full Name field shows users’ email addresses**

For a SAML site, the Full Name field is populated with the email address if the assertions for first and last name or full name are not provided in Step 5 of the Authentication page.

**Unable to authenticate users when using single sign-on**

SAML authentication takes place outside Tableau Online, so troubleshooting authentication issues can be difficult. However, login attempts are logged by Tableau Online. You can create a snapshot of log files and use them to troubleshoot problems.

If a user is having trouble being authenticated on Tableau Online, you should examine the log file to ensure that email attribute values returned by the IdP match the email addresses of users.

To download the log file:
1. Sign in to Tableau Online.
2. Display the Authentication page, and then under Step 7, click Download log file.

Signing In through Command Line Utilities

SAML is not used for authentication when you sign in to Tableau Online using tabcmd or the Tableau Data Extract command line utility (provided with Tableau Desktop), even if Tableau Online is configured to use SAML. These tools require TableauID authentication configured when Tableau Online was originally provisioned.

Personal Access Tokens

Personal access tokens (PATs) provide Tableau Online users the ability to create long-lived authentication tokens. The tokens allow users to run automation with Tableau REST APIs without requiring hard-coded credentials or interactive sign in. More information about using personal access tokens with Tableau REST APIs is at Signing In and Out (Authentication).

Personal access tokens are not used for generic client access to Tableau Online. To use personal access tokens with tabcmd, install the new version of tabcmd from https://tableau.github.io/tabcmd/.

Note: You must use a PAT, instead of user name and password, to make a REST API sign in request to Tableau Online with multi-factor authentication (MFA) enabled with Tableau authentication.

We recommend creating personal access tokens for automated scripts and tasks that are created with Tableau REST API:

- **Improve security:** Personal access tokens reduce risk in the event credentials are compromised. In the case where Tableau Server uses Active Directory as an identity store, you can reduce the scope of credential compromise by using a personal access token for automated tasks. In this case, using an application-specific token doesn’t expose the broader system in the event that automation or script files are compromised. If a token gets compromised or is used in automation that is failing or posing
a risk, you can just revoke the token. You do not need to rotate or revoke the user’s credentials.

- **Manage automation**: A token can be created for each script or task that is run. This allows you to silo and review automation tasks across your organization. Additionally, by using tokens then password resets or metadata changes (username, email, etc.) on user accounts will not disrupt automation as it would when credentials are hard-coded into the scripts.

### Understand personal access tokens

When a token is created, it is hashed then stored in the repository. After the token is hashed and stored, the original token is deleted. Users are instructed to copy the token to a safe place and to handle it as they would a password. When the token is used at run-time, Tableau Online hashes the token presented by the user and compares it to the hashed value stored in the repository. If a match is made, then an authenticated session is started.

**Note**: One personal access token is required per concurrent request. Signing in again with the same access token, whether at the same site or a different site, will terminate the previous session and result in an authentication error.

In the context of authorization, Tableau Online handles the authenticated session with same permissions and rights that the user has as an interactive user.

### Create tokens

Users with accounts on Tableau Online can create, manage, and revoke personal access tokens on the **My Account Settings** page. For more information, see [Manage Your Account Settings](https://help.tableau.com) in the Tableau Help.

Users must create their own personal access tokens. Site admins can’t create tokens on behalf of their users.
Token expiry

Personal access tokens will expire if they are not used after 15 consecutive days. If they are used more frequently than every 15 days, an access token will expire after 1 year. After a year, you must create a new token. These expiration values are not configurable. Expired personal access tokens will not display on the My Account Settings page.

Revoke users’ tokens

Users are able to revoke their own tokens on the My Account Settings page. As an administrator, you can also revoke personal access tokens.

1. Sign in to Tableau Online using your site admin credentials and navigate to the Users page.
2. Locate the user whose token you want to revoke. For more information about navigating Server Admin pages and locating users, see View, Manage, or Remove Users.
3. Click the user’s name to open their profile page.
4. On the user’s profile page, click the Settings tab.
5. In the Personal Access Tokens section, identify the token that you want to revoke and then click Revoke.
6. On the verification pop-up, click Delete.

Configure Tableau Connected Apps to Enable SSO for Embedded Content

Beginning in January 2022, Tableau connected apps enable a seamless and secure authentication experience by facilitating an explicit trust relationship between your Tableau Online site and custom applications where Tableau content is embedded.

Connected apps offer the following benefits:

- Restrict access to which content can be embedded and where that content can be embedded
- Provide users the ability to access embedded content using single sign-on (SSO) without having to integrate with an identity provider (IdP)
- Provide users the ability to authenticate directly from your custom application
Programatically authorize access to the Tableau REST API on users' behalf using JSON Web Token (JWT) (added in June 2022)

Scope Tableau REST API capabilities users or applications can perform (added in June 2022)

**Note:** Tableau connected apps and Salesforce connected apps are different and offer different functionality. Today, Tableau connected apps are optimized for embedding Tableau views and metrics in custom applications.

**Note:** If your connected app is running in a container, such as an EC2 instance, both the container and the host clocks must be set to UTC in order for the session token to be valid. If either clock uses a different standard, the connected app will not be trusted.

**How connected apps work**

The trust relationship between your Tableau Online site and custom application is established and verified through an authentication token in the JSON Web Token (JWT) standard, which uses a shared secret provided by the Tableau connected app and signed by your custom application.

**Key components of a connected app**

The following components of the connected work together with the JWT in your custom application to authenticate users and display embedded content.

- **Secrets:** Secrets are keys shared by Tableau and your custom application. They are used in signatures that form the JWT. A secret is required when using connected apps for embedding authentication. Secrets can be created in a connected app, do not expire, and remain valid until deleted.

- **Domain allowlist (embedding workflows only):** You can specify a list of allowed domains in each connected app. Tableau content embedded through a connected app is only allowed under the specified domains. This helps ensure that content is exposed under the domains that are secured and approved by your business.

- **Access level (embedding workflows only):** You can specify what content can be embedded through a connected app by associating a connected app with one project or all projects. If you specify one project, only the content in the selected project can be embedded through the connected app.
1. **User visits the webpage:** When a user visits the embedded content on a webpage, webpage sends a GET request to your custom application to retrieve the HTML on that webpage.

2. **Custom application constructs an authentication token:** The custom application constructs a JWT, which contains a secret from the connected app (see Step 3 below for additional JWT requirements) and the scope of user access for the embedded content. The secret is signed by custom application and is used for verification of the trust relationship in a later step.

3. **Custom application responds with authentication token:** The custom application responds to the page with the JWT in the embedded content’s URL called by the webpage.

4. **Webpage requests content from Tableau:** With the attempt to load the embedded content, the webpage calls the embedded content’s URL, which sends a GET request to Tableau.

5. **Tableau validates the token:** Tableau receives the JWT and verifies the trust relationship with the custom application by identifying the connected app and shared secret used in the JWT. Then Tableau creates a session for the user. The session not only respects the embedding scopes defined in the JWT, but also the restrictions specified in the connected app, including the allowed domains and allowed projects.
6. **Tableau returns the content based on the restricted embedding context**: The embedded content only loads when the page is under an allowed domain and the content is published to an allowed project (if applicable). The authenticated user can only interact with the embedded content by the scope defined in the JWT.

**Create a connected app**

**Step 1: Create a connected app**

Create a connected app from Tableau Online’s Settings page.

1. As a site admin, sign in to Tableau Online.

2. From the left pane, select Settings > Connected Apps, and then click the **New Connected App** button.

3. In the Create Connected App dialog box, do the following:
   
   a. For *REST API authorization workflows*, in the Connected app name text box, enter a name for the connected app and click the **Create** button.

      **Note**: You can ignore **Access level** and **Domain allowlist** when configuring a connected app for REST API authorization.

   b. For *embedding workflows*, do the following:
      
      a. In the Connected app name text box, enter a name for the connected app.

      b. From the Applies to drop-down menu, select **All project** or **Only one project** to control which views or metrics can be embedded. If you select the "Only one project" option, select the specific project to scope to.

      c. In the Domain allowlist, specify the domains using the rules described in Domain formatting below to control where views or metrics can be embedded.
Tableau Online Help

d. When finished, click the **Create** button.

4. Next to the connected app's name, click the actions menu and select **Enable**. For security purposes, a connected app is set to disabled by default when created.

5. Make note of the connected app's ID, also known as the client ID, to use in Step 3 below.
Step 2: Generate a secret

You can generate a total of two secrets for each connected app. The second secret can be used for secret rotation purposes to help protect against issues if a secret is compromised.

1. On the detail page of the connected app you created in Step 1, click the Generate New Secret button.

2. Make note of the secret ID and secret value to use in Step 3 below.

Step 3: Configure the JWT

After you’ve generated a secret, you want to enable your custom application to send a valid JWT. JWT is a standard used to securely transfer information between two parties. The JWT is signed by your custom application to securely send information to Tableau Online. The JWT references the connected app, the user that the session is being generated for, and the level of access the user should have.

A valid JWT includes the following information:

- Connected app ID, also known as the client ID, from Step 1
- Secret ID and secret value generated in Step 2
- Registered claims and header:

<table>
<thead>
<tr>
<th>Claim</th>
<th>Description or required value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;kid&quot;</td>
<td>Required (in header). The connected app secret ID.</td>
</tr>
<tr>
<td>(Secret ID)</td>
<td></td>
</tr>
<tr>
<td>&quot;iss&quot;</td>
<td>Required (in header). Unique issuer URI that identifies the trusted connect app and its signing key.</td>
</tr>
<tr>
<td>(Issuer)</td>
<td></td>
</tr>
<tr>
<td><strong>&quot;alg&quot; (Algorithm)</strong></td>
<td>Required (in header). JWT signing algorithm. Only HS256 is supported.</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>&quot;sub&quot; (Subject)</strong></td>
<td>User name (email address) of the authenticated Tableau Online user.</td>
</tr>
<tr>
<td><strong>&quot;aud&quot; (Audience)</strong></td>
<td>Value must be: &quot;tableau&quot;</td>
</tr>
<tr>
<td><strong>&quot;exp&quot; (Expiration Time)</strong></td>
<td>A valid JWT must not be expired. The expiration time (in UTC) of the JWT must be within the maximum validity period, which is 10 minutes.</td>
</tr>
<tr>
<td><strong>&quot;jti&quot; (JWT ID)</strong></td>
<td>Required as a claim. The JWT ID claim provides a unique identifier for the JWT and is case sensitive.</td>
</tr>
<tr>
<td><strong>&quot;scp&quot; (Scope)</strong></td>
<td>For <strong>embedding workflows</strong>, supported values include:</td>
</tr>
<tr>
<td></td>
<td>&quot;tableau:views:embed&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;tableau:views:embed_authoring&quot; <em>(Added in June 2022)</em></td>
</tr>
<tr>
<td></td>
<td>&quot;tableau:metrics:embed&quot;</td>
</tr>
</tbody>
</table>

**Notes:**

- Values must be passed as a list type.
- For **tableau:views:embed** and **tableau:views:embed_authoring**, the scope respects users’ permissions already configured in Tableau Online and allows users to interact with the tools in the embedded view if available in the original view.
- We recommend the embed code exclude the toolbar parameter. For more information see Known issues.
Example JWTs

Here are example JWTs in both Java and Python languages. The Java and Python examples use the nimbus-jose-jwt library and the PyJWT library, respectively.

Java

```java
import com.nimbusds.jose.*;
import com.nimbusds.jose.crypto.*;
import com.nimbusds.jwt.*;
import java.util.*;
...

String secret = "secretvalue";
    String kid = "connectedAppSecretId";
    String clientId = "connectedAppClientId";
    List<String> scopes = new ArrayList<>(Arrays.asList("tableau:views:embed"));
    String username = "user@domain.com";
    JWSSigner signer = new MACSigner(secret);
    JWSHeader header = new
    JWSHeader.Builder(JWSAlgorithm.HS256).keyID(kid).customParam
    ("iss", clientId).build();
    JWTClaimsSet claimsSet = new JWTClaimsSet.Builder()
        .issuer(clientId)
        .expirationTime(new Date(new Date().getTime() + 60 * 1000))
    //expires in 1 minute
        .jwtID(UUID.randomUUID().toString())
        .audience("tableau")
        .subject("username")
```

Python

```python
import jwt
import uuid
import datetime

secret = "secretvalue"

kid = "connectedAppSecretId"
clientId = "connectedAppClientId"
scopes = ["tableau:views:embed"]
username = "user@domain.com"

jwt_secret = str(uuid.uuid4())

payload = {
    "iss": clientId,
    "exp": int((datetime.datetime.utcnow() + datetime.timedelta(minutes=1)).timestamp()),
    "aud": "tableau",
    "sub": username,
}

jwt_token = jwt.encode(payload, jwt_secret, algorithm="HS256")
```
```java
.claim("scp", scopes)
.build();
SignedJWT signedJWT = new SignedJWT(header, claimsSet);
signedJWT.sign(signer);
model.addAttribute("token", signedJWT.serialize());
```

**Python**

```python
import jwt

token = jwt.encode(
    {
        "iss": connectedAppClientId,
        "exp": datetime.datetime.utcnow() + datetime.timedelta(minutes=5),
        "jti": str(uuid.uuid4()),
        "aud": "tableau",
        "sub": user,
        "scp": ["tableau:views:embed", "tableau:metrics:embed"]
    },
    connectedAppSecretKey,
    algorithm = "HS256",
    headers = {
        'kid': connectedAppSecretId,
        'iss': connectedAppClientId
    }
)

After you’ve configured the JWT, when the code is run by your custom application, it will generate a token.

**Step 4: Next steps**

**For embedding workflows**

After JWT has been configured, you must add embed code to your custom application. Ensure that you include the valid JWT you configured in Step 3 above in the web component...
that your custom application calls.

For more information about embedding Tableau content, see one or both of the following:

- Embed metrics, see Embed Metrics into Webpages topic in the Tableau Help.
- Embed Tableau views and metrics using the Tableau Embedding API v3.

**Note:** For users to successfully authenticate when they access embedded content, browsers must be configured to allow third-party cookies.

For REST API authorization workflows

(Added in June 2022)

After the JWT has been configured, you must add the valid JWT to the REST API Sign In request for authorized access. For more information, see Access Scopes for Connected Apps.

Manage a connected app

The Connected Apps page is where you can manage all the connected apps for your site. You can perform tasks such creating, deleting, and disabling connected apps; and revoking or generating new secrets if existing secrets have been compromised.

1. As a site admin, sign in to Tableau Online.
2. From the left pane, select **Settings > Connected Apps**.
3. Select the check box next to the connected app you want to manage and do one or more of the following:
   - **Generate a new secret** according to the rotation time line specified by your organization’s security policies. To generate an additional secret, click on the name of the connected app and then click the **Generate New Secret** button. A connected app can have a maximum of two secrets. Both secrets can be active at the same time, do not expire, and remain valid until deleted.
Review the connected app details by clicking the name of the connected app to see when the connected app was created, its ID, project and domain scopes, and its secrets.

Change the project scope or domain, in the Actions menu, select Edit. Make your changes and click Update.

Note: If you change the project or domain scopes and the embedded content doesn’t exist in either the new project or new domain, the embedded view or metric is unable to display and users will see an error when accessing the embedded content.

Delete a secret by clicking the connected app’s name. On the connected app’s page, click Actions next to the secret and select Delete. In the confirmation dialog box, select Delete again.

Note: If the connected app’s secret is being used by a custom application, the embedded view or metric is unable to display after the secret is deleted. For more information, see Effects of disabling or deleting a connected app, or deleting a secret below.

Disable a connected app, in the Actions menu, select Disable. If the connected app is being used by a custom application, the embedded view or metric is unable to display after the connected app is disabled. For more information, see Effects of disabling or deleting a connected app, or deleting a secret below.
Effects of disabling or deleting a connected app, or deleting a secret

To display an embedded view or metric to your user or enable REST API access through a connected app requires the connected app to be enabled and secret generated. If the connect app is being used in your custom application and is either disabled or deleted, or its secret deleted or replaced, users will get 403 error.

To avoid this issue, ensure the connect app is enabled and the JWT is using the correct secret ID and value.

Domain allowlist rules (embedding workflows only)

The connected app’s domain allowlist enables you to restrict access to embedded Tableau content to all domains or some domains; or exclude some domains or block all domains.
Domain options

You can select one of two options when configuring a connected app’s domain allowlist:

- **All domains**: As the default option, this option enables unrestricted access to embedded content.
- **Only specific domains**: This option gives you the ability to scope down access to embedded content. If you use this option, follow the formatting rules specified in the following section, Domain formatting.

Domain formatting

In the domain allowlist text box, you can enter one domain, multiple domains, or no domains at all. The domain allowlist respects any formatting allowed by the CSP (Content Security Policy) framework’s `frame-ancestors header`.

**Note**: Domain formatting rules also apply when using the Connect App methods in the Tableau REST API.

Here are some formatting examples based on common scenarios:

<table>
<thead>
<tr>
<th>To specify...</th>
<th>Example</th>
<th>Embedding access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of domains</td>
<td>*.myco.com</td>
<td>Embedded content is accessible from all subdomains under myco.com.</td>
</tr>
<tr>
<td>Multiple discrete domains</td>
<td>myco.com events.myco.com ops.myco.com</td>
<td>Embedded content is accessible from all three domains.</td>
</tr>
<tr>
<td>No domains</td>
<td>[no domains]</td>
<td>Access to embedded content is blocked.</td>
</tr>
</tbody>
</table>

Known issues (embedding workflows only)

There are a couple of known issues when using connected apps that will be addressed in a future release.

- **Toolbar features**: When embedded content has the toolbar parameter defined, not all toolbar features will work. To work around this issue, we recommend you hide the...
toolbar parameter like in the example below.

```html
<tableau-viz id='tab-viz' src='https://online.tableau.com/t/<your_site>/...
   toolbar='hidden'>
</tableau-viz>
```

- **Published data sources**: Published data sources set to **Prompt User** for database credentials will not display. To work around this issue, if possible, we recommend data source owners embed their database credentials instead.

- **AskData zones in embedded dashboard**: An AskData zone will fail to load if it is within an embedded dashboard.

**Access Scopes for Connected Apps**

Beginning in June 2022 (Tableau Online only), using Tableau connected apps, you can programmatically call and access the Tableau REST API through your custom application on behalf of Tableau Online users. Access to the REST API is enabled by a JSON Web Token (JWT) defined as part of the initial Sign In request. The JWT must contain scopes that define the REST API methods that are available to your custom application and its users through the connected app.

Authorize access to the REST API using connected apps to:

- Enhance efficiency—using a JWT as a bearer token enables a simplified impersonation with one request to the Sign In endpoint instead of two requests
- Extend and automate complex Tableau integrations and backend queries—such as dynamic content retrieval and advanced filtering

**Scope types**

Connected apps use scopes that grant access to actions on content or administrative tasks through the REST API methods that support JWT authorization (below). A scope is a colon-separated string that starts with the namespace `tableau`, followed by the Tableau resource that access is being granted to, such as `datasources`, and ends with the action that is allowed on the resource, such as `update`. 
The actions a scope can take include:

- create
- read
- run
- update
- download
- delete

For example, a scope that allows your custom application to call the Update Data Source method looks like:

```
tableau:datasources:update
```

Summary of how to authorize REST API access

The following list summarizes the steps to request access to the REST API through a JWT:

1. **Create a connected app**
2. **Generate a valid JWT**—at runtime your custom application will generate a valid JWT, configured with the scopes you have included
3. **Make a Sign In request**—your custom application will make a Sign In request using the JWT to return a Tableau access token and site ID (LUID)
4. **Use the Tableau access token in subsequent requests**—in subsequent REST API calls, use 1) the Tableau access token as the X-Tableau-Auth header value and 2) the site ID (LUID) in the request URI

Example

For example, suppose you create a connected app using direct trust. Using direct trust, your custom application that calls the REST API generates a valid JWT using the client ID and client secret generated by the connected app.

**Scopes in the JWT**

To successfully authorize access to the REST API, the JWT must also contain the scopes that define the REST API capabilities. For example, to enable various data source-related methods, you might include the following scopes in the JWT:

**Note:** Scope values must be passed as a list type.

**Sign In Request URI**

To make a call to the REST API, your custom application must first make a Sign In request to generate a Tableau access token.

POST https://us-west-2b.online.tableau.com/api/3.16/auth/signin

**Request body**

To authorize REST API access using a JWT, the Sign In request body must contain the valid JWT like the example below.

```xml
<tsRequest>
  <credentials jwt="eyJpc3MiOiI4ZTFiNzE3Mi0zOWMzLTRhMzItODg3ZS1mYzJiNDExOWY1NmQiLCJhY2NlcnZpZCI6ImIwMTE1YmY5LTNhNGItNGM5MS1iMDA5LWNmMGxNzBiMWE1NiJ9.eyJhZG1pbkBcIjoic3ViI282TableauSoftwareTableau Online Help
```
Response body

The Sign In request produces the following response body, which includes the Tableau access token.

```xml
<tsResponse>
  <credentials token="12ab34cd56ef78ab90cd12ef34ab56cd">
    <site id="9a8b7c6d5-e4f3-a2b1-c0d9-e8f7a6b5c4d" contentUrl="/"/>
    <user id="9f9e9d9c-8b8a-8f8e-7d7c-7b7a6f6d6e6d"/>
  </credentials>
</tsResponse>
```

After the Tableau access token is generated, add the Tableau access token to the header of all subsequent REST API requests.

**Header**

```
X-Tableau-Auth:12ab34cd56ef78ab90cd12ef34ab56cd
```

All subsequent REST API requests using the Tableau access token are then bounded by the scopes in the JWT.

REST API methods that support JWT authorization

The following scopes can be associated with the connected app to define access and methods your custom application can have to the REST API on users' behalf.
Notes:

- For other REST API capabilities not listed in the table below, you can use other authorization mechanisms to access the methods. For more information, see Authentication Methods in the Tableau REST API Help.
- For scopes supported by the Embedding API v3, see Configure Tableau Connected Apps to Enable SSO for Embedded Content

<table>
<thead>
<tr>
<th>Method</th>
<th>Scope</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No scope</td>
<td>(No scope)</td>
<td>When no scopes are defined in the JWT, access to the REST API is denied</td>
</tr>
<tr>
<td>Data sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publish data source</td>
<td><code>tableau:datasources:create</code></td>
<td>Publish a data source to a site or append data to an existing published data source</td>
</tr>
<tr>
<td>Query data source</td>
<td><code>tableau:content:read</code></td>
<td>Get information about a published data source</td>
</tr>
<tr>
<td>Query data sources</td>
<td><code>tableau:content:read</code></td>
<td>Get information about all published data source on a site</td>
</tr>
<tr>
<td>Query data source connections</td>
<td><code>tableau:content:read</code></td>
<td>Get server address, port, user name, or password information about a published data source</td>
</tr>
<tr>
<td>Update data source</td>
<td><code>tableau:datasources:update</code></td>
<td>Update owner, project or certification status of the data source</td>
</tr>
<tr>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Update data source connection</td>
<td>tableau:datasources:update</td>
<td>Update server address, port, user name, or password of the data source connection</td>
</tr>
<tr>
<td>Update data source now</td>
<td>tableau:tasks:run</td>
<td>Run extract refresh</td>
</tr>
<tr>
<td>Flows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publish flow</td>
<td>tableau:flows:create</td>
<td>Publish a flow</td>
</tr>
<tr>
<td>Metrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get metric</td>
<td>tableau:content:read</td>
<td>Get a metric</td>
</tr>
<tr>
<td>Delete metric</td>
<td>tableau:metrics:delete</td>
<td>Delete a metric</td>
</tr>
<tr>
<td>List metrics</td>
<td>tableau:content:read</td>
<td>Get list of metrics for a site</td>
</tr>
<tr>
<td>Query metrics data</td>
<td>tableau:metrics:download</td>
<td>Get underlying data of a metric in comma-separated value (.csv) format</td>
</tr>
<tr>
<td>Update metric</td>
<td>tableau:metrics:update</td>
<td>Update owner, project, suspend status, and name of the metric</td>
</tr>
<tr>
<td>Views</td>
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</tr>
<tr>
<td>Get view</td>
<td>tableau:content:read</td>
<td>Get details about a view</td>
</tr>
<tr>
<td>Get view by path</td>
<td>tableau:content:read</td>
<td>Get details for all views on a site using the spe-</td>
</tr>
<tr>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Query view data</td>
<td>tableau:views:download</td>
<td>Get a view rendered in comma-separated value (.csv) format</td>
</tr>
<tr>
<td>Query view PDF</td>
<td>tableau:views:download</td>
<td>Get a view as a PDF (.pdf) file</td>
</tr>
<tr>
<td>Query view image</td>
<td>tableau:views:download</td>
<td>Get a view as an image (.png) file</td>
</tr>
<tr>
<td>Query views for site</td>
<td>tableau:content:read</td>
<td>Get all views for a site</td>
</tr>
<tr>
<td>Query view preview image</td>
<td>tableau:views:download</td>
<td>Get the thumbnail image (.png) of the view</td>
</tr>
<tr>
<td>Workbooks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publish workbook</td>
<td>tableau:workbooks:create</td>
<td>Publish a workbook (.twb or .twbx)</td>
</tr>
<tr>
<td>Query workbook</td>
<td>tableau:content:read</td>
<td>Get a specified workbook and its details</td>
</tr>
<tr>
<td>Query workbook for site</td>
<td>tableau:content:read</td>
<td>Get a list of workbooks published to a site</td>
</tr>
<tr>
<td>Query workbook preview image</td>
<td>tableau:workbooks:download</td>
<td>Get the thumbnail image (.png) of the workbook</td>
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<tr>
<td>Update workbook</td>
<td>tableau:workbooks:update</td>
<td>Modify an existing workbook</td>
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<tr>
<td>Update workbook</td>
<td>tableau:workbooks:update</td>
<td>Update the connection information</td>
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<tr>
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<tr>
<td>connection</td>
<td></td>
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<tr>
<td>Update workbook now</td>
<td><code>tableau:tasks:run</code></td>
<td>Initiate a workbook refresh outside of a scheduled task</td>
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<tr>
<td>Publish</td>
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<tr>
<td>Append to file upload</td>
<td><code>tableau:file_upgrades:create</code></td>
<td>Upload a block of data and append it to the data that is already uploaded - to be used after an upload has been initiated using the &quot;initiate file upload&quot; method</td>
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<tr>
<td>Initiate file upload</td>
<td><code>tableau:file_upgrades:create</code></td>
<td>Initiate the upload process of a file</td>
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<tr>
<td>Download</td>
<td></td>
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</tr>
<tr>
<td>Download data source</td>
<td><code>tableau:datasources:download</code></td>
<td>Download the data source (.tdsx)</td>
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<tr>
<td>Download view crosstab Excel</td>
<td><code>tableau:views:download</code></td>
<td>Download an Excel (.xlsx) file containing crosstab data from the view</td>
</tr>
<tr>
<td>Download workbook</td>
<td><code>tableau:workbooks:download</code></td>
<td>Download a workbook (.twb or .twbx)</td>
</tr>
<tr>
<td>Download workbook revision</td>
<td><code>tableau:workbooks:download</code></td>
<td>Download a specific version of the workbook (.twb or .twbx)</td>
</tr>
<tr>
<td>Download</td>
<td><code>tableau:views:download</code></td>
<td>Download a PDF (.pdf)</td>
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<tr>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
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<tr>
<td>workbook PDF</td>
<td></td>
<td>file containing images of the sheets in the workbook</td>
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<td>Download workbook</td>
<td><code>tableau:views:download</code></td>
<td>Download a Power Point (.pptx) file containing slides of the sheets in the workbook</td>
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<td>Add a user to a group</td>
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<td>Update user</td>
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<td>Method</td>
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<td>Description</td>
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<td>Create group</td>
<td>tableau:groups:create</td>
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<td>Delete group</td>
<td>tableau:groups:delete</td>
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<td>Get groups for user</td>
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<td>Get a list of groups that a user belongs to</td>
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<td>tableau:projects:create</td>
<td>Create a project</td>
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<td>Delete project</td>
<td>tableau:projects:delete</td>
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<td>Query project</td>
<td>tableau:content:read</td>
<td>Get a list of projects</td>
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<tr>
<td>Update project</td>
<td>tableau:projects:update</td>
<td>Update the name, description, or project hierarchy of the project</td>
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<td>Permissions</td>
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<tr>
<td>Add data source permissions</td>
<td>tableau:permissions:update</td>
<td>Add permissions to a data source for a Tableau Server user or group</td>
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<tr>
<td>Add default permissions</td>
<td>tableau:permissions:update</td>
<td>Add default permission capabilities to a user or</td>
</tr>
<tr>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
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<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>Add project permissions</td>
<td><code>tableau:permissions:update</code></td>
<td>Add permissions to a project for a user or group</td>
</tr>
<tr>
<td>Add view permissions</td>
<td><code>tableau:permissions:update</code></td>
<td>Add permissions to a view for a user or group</td>
</tr>
<tr>
<td>Add workbook permissions</td>
<td><code>tableau:permissions:update</code></td>
<td>Add permissions to a specified workbook for a user or group</td>
</tr>
<tr>
<td>Delete data source permissions</td>
<td><code>tableau:permissions:delete</code></td>
<td>Delete default permission capabilities of a user or group, for metric, flow, workbook, data source, data role, or lens resources in a project</td>
</tr>
<tr>
<td>Delete default permissions</td>
<td><code>tableau:permissions:delete</code></td>
<td>Delete default permission capabilities of a user or group, for metric, flow, workbook, data source, data role, or lens resources in a project</td>
</tr>
<tr>
<td>Delete project permissions</td>
<td><code>tableau:permissions:delete</code></td>
<td>Delete the project permission for a user or group</td>
</tr>
<tr>
<td>Method</td>
<td>Scope</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>missions</td>
<td>group</td>
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<tr>
<td>Delete view permissions</td>
<td><code>tableau:permissions:delete</code></td>
<td>Delete the view permission for a user or group</td>
</tr>
<tr>
<td>Delete workbook permis</td>
<td><code>tableau:permissions:delete</code></td>
<td>Delete the workbook permission for a user or group</td>
</tr>
<tr>
<td>Query data source perm</td>
<td><code>tableau:permissions:read</code></td>
<td>Get a list of permissions for the data source</td>
</tr>
<tr>
<td>Query default permis</td>
<td><code>tableau:permissions:read</code></td>
<td>Get default permission capabilities of users and groups for metric, flow, workbook, data source, data role, or lens resources in a project</td>
</tr>
<tr>
<td>Query project permis</td>
<td><code>tableau:permissions:read</code></td>
<td>Get a list of permissions for the project</td>
</tr>
<tr>
<td>Query view permis</td>
<td><code>tableau:permissions:read</code></td>
<td>Get a list of permissions for the view</td>
</tr>
<tr>
<td>Query workbook permis</td>
<td><code>tableau:permissions:read</code></td>
<td>Get a list of permissions for the workbook</td>
</tr>
<tr>
<td>Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get recently viewed site</td>
<td><code>tableau:content:read</code></td>
<td>Get views and workbooks details on the most recently created,</td>
</tr>
</tbody>
</table>
Method | Scope | Description
--- | --- | ---
Query site | tableau:content:read | Get information about a site
Query views for site | tableau:content:read | List all views on a site
Update site | tableau:sites:update | Update a site

**Troubleshoot Connected Apps**

When embedded content fails to display in your custom application or Tableau REST API authorization fails, you can use a browser’s developer tools to inspect and identify error codes that might be associated with the Tableau connected app that’s used to display the embedded content.

Refer to the table below to review the description of the error code and potential resolution.

<table>
<thead>
<tr>
<th>Error code</th>
<th>Summary</th>
<th>Description</th>
<th>Potential resolution or explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>SYSTEM_ USER_NOT_ FOUND</td>
<td>Tableau user could not be found</td>
<td>To resolve this issue, verify the 'sub' (Subject) claim value in the JWT is the user name (email address) of the authenticated Tableau Online user. This value is case sensitive.</td>
</tr>
</tbody>
</table>
| 16 | LOGIN_ FAILED | Login failed | This error is typically caused by one of the following claim issues in the JWT:
- The 'exp' (Expiration Time) exceeds the default maximum validity period. To resolve this issue, review [registered claims](https://help.tableau.com/#/docs/online/34/en-us/tableaunotfounderror5-ja.html) |
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>CONNECTED_APP_NOT_FOUND</td>
<td>The connected app could not be found To resolve this issue, verify the connected app is enabled and the correct client ID (also known as the connect app ID) is referenced in the JWT.</td>
</tr>
<tr>
<td>127</td>
<td>CONNECTED_APP_SECRET_NOT_FOUND</td>
<td>The connected app's secret could not be found To resolve this issue, verify the correct connected app's secret ID and secret value are referenced in the JWT.</td>
</tr>
<tr>
<td>128</td>
<td>CONNECTED_APP_SECRET_LIMIT_EXCEEDED</td>
<td>Maximum limit for secrets has been reached A maximum of two secrets are allowed for a connected app. This error can occur when there's an attempt to create a third secret. To resolve this issue, delete a secret from the connected app before creating a new one.</td>
</tr>
<tr>
<td>133</td>
<td>INVALID_CONNECTED_APP_DOMAIN_SAFELIST</td>
<td>Domain allowlist contains one or more invalid characters This error can occur when the domain allowlist contains one or more invalid characters.</td>
</tr>
<tr>
<td>10083</td>
<td>BAD_JWT</td>
<td>JWT header contains issues This error is typically caused by one of the following issues with the JWT header:</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Details</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10084</td>
<td>JWT_PARSE_ERROR</td>
<td>JWT contains issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To resolve this issue, verify the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The 'aud' (Audience) value referenced in the JWT uses the &quot;tableau&quot; value. This value is case sensitive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The 'aud' (Audience) and 'sub' (Subject) are included in the JWT.</td>
</tr>
<tr>
<td>10085</td>
<td>COULD_NOT_FETCH_JWT_KEYS</td>
<td>JWT could not find keys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Could not find the secret.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To resolve this issue, verify the correct keyId (Kid) is used in the JWT header.</td>
</tr>
<tr>
<td>10089</td>
<td>CONNECTED_APP_NOT_FOUND</td>
<td>Could not find connected app</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To resolve this issue, ensure the issuer is calling the correct connected app ID (also known as the client ID).</td>
</tr>
<tr>
<td>10090</td>
<td>CONNECTED_APP_DISABLED</td>
<td>Connected app is disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The connected app used to verify trust is disabled. To resolve this issue, enable the connected app.</td>
</tr>
<tr>
<td>10091</td>
<td>JTI_ALREADY_USED</td>
<td>Unique JWT required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The JWT has already been used in the authentication process. To resolve this issue, a new JWT must be generated.</td>
</tr>
</tbody>
</table>
Monitor Site Activity

Find Admin Views

The Site Status page contains an embedded Tableau workbook with various admin views. These views help you to monitor different types of site activity.

- Allows you to access the Admin Insights project, which you can use to build custom admin views about your site.
- Shows you general site activity for Tableau Online.
- Shows you general Tableau Bridge activity.

Navigate to admin views

To see the Admin Insights project or admin views, click Site Status. Site administrators can see administrative views for their site.

Use Admin Insights to Create Custom Views

You can get more visibility into your Tableau Online deployment by using Admin Insights.

Admin Insights is a Tableau Online-only project that is pre-populated with carefully curated data sources and a pre-built workbook of your site’s data. Using the resources available to you through the Admin Insights project, you can create custom views to help answer a range of common questions you might have about your site.

For example:
What's my Tableau Online adoption rate in my organization?

What are common trends around the site's deployment?

What content is popular?

What are my users doing?

How should licenses be allocated?

Connect to Admin Insights data

If you're a site admin or someone who has been granted access to the Admin Insights project, you can access the Admin Insights data sources directly from Tableau Online using Web Authoring or through Tableau Desktop.

From Tableau Online

1. Sign in to Tableau Online and navigate to the Admin Insights project.

2. Select Create > Workbook and select one of the data sources to get started.

From Tableau Desktop

1. Open Tableau Desktop, under Connect, select Tableau Server.

   Note: If you're not already signed in to Tableau Online, in the Tableau Server Sign In dialog box, click the Tableau Online hyperlink. Enter your Tableau Online credentials and then click Sign In.

2. In the search box, type the name of the data source you're looking for.

3. Select a data source and click Connect to get started with your analysis.
Start creating custom views

As you think about how you want to approach the analysis of your site and user metrics, consider some of the following questions that organizations commonly ask:

- What are the most popular views or data sources?
- Who are the most active users (i.e., who are the power users)?
- What are the most common tasks performed on the site?
- How many licenses are being used?
- Who hasn't signed in to the site in more than 90 days?

Explore the pre-built workbook

To help you answer the above questions (and more), go to the pre-built workbook, Admin Insights Starter, to see what kind of insights it can offer. The pre-built workbook is intended to serve as template on which to build more detailed dashboards and workbooks that go more in depth and address questions you have that are unique to your site deployment or organization.

User Role Drilldown

Focus: Site activity
Data source: TS Users
Use this dashboard to explore high-level site activity by user role.

This dashboard shows you some of the ways you can analyze your site’s log and activity metrics. Although Admin Insights captures up to 90 days of data (365 days with an Advanced Management license), the “Last Publish” and “Last Access” dates can go back to as early as the date the site was created.

**Do more with this dashboard:**

- Change the "Inactivity threshold" (yellow by default) using the parameter control in the upper-right corner.
- Create URL actions that can email users based on their activity type. For example, email users when they haven’t signed in to the site, accessed content, or published content in the last 90 days.
- Create additional views for this dashboard that compares the last 90 days (default) of activity (sign in, access, or publish) to the last 30 days, 60 days, and all days.

**Login Activity Drilldown**

**Focus:** Sign-in activity  
**Connects to:** TS Events (primary), TS Users (secondary)

Use this dashboard to explore trends in sign-in activity.

Using the “Select Events or Distinct Actors” selector on the left, you can see your site’s weekly, daily, and hourly sign-in-related activity. Because there are two data sources behind this dashboard, you can see sign-ins by all users, not just users with recent sign-in activity.

**Do more with this dashboard:** Duplicate the dashboard and keep only the “Login user breakdown.” Then change the filter on the “Last Login Date” to null to see a list of users who have never signed in to the site. You can also email them depending on what kind of action you want users to take.
Traffic and Adoption Drilldown & Publish Event Drilldown

**Focus:** Content access and usage  
**Connects to:** TS Events

The information in the dashboards show you the following type of information:

- View access activity: When a view has been accessed and by whom.
- Data source access activity: When 1) a published data source has been connected to through Web Authoring or Tableau Desktop or 2) a user has viewed or published a workbook that uses the published data source.
- Workbook publish activity: When a workbook has been published and by whom.
- Data source publish activity: When a published data source has been published and by whom.

**Do more with this dashboard:** Using the “Project Name” selector in the upper-right corner, select a project on your site to filter on.

**Note:** This filter affects all sheets in the Admin Insights Starter.

Explore the data sources

Alternatively, you can connect to the Admin Insights data directly. Explore the data on your own by hovering over each field (both dimensions and measures) to read a description of the data that’s being captured.

**TS Events**

Tableau Online Help
TS Events functions as a primary audit data source. It contains data about the various events happening on your site, including sign-ins, publishes, and accessed views.

**Example: What are the most popular views?**

1. Connect to the TS Events data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Item Name" to the Rows shelf and "Number of Events" to the Columns shelf.

3. From the Data pane, drag "Item Type" to the Filters shelf, and select the View check box.

**Do more with this data source:** Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you’re analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID".

- Join TS Events to TS Users on "Actor User ID = User ID"
- Join TS Events to Site Content on "Item ID = Item ID" and "Item Type = Item Type"

For more information, see Aggregate, Join, or Union Data in Tableau Prep Help.

**TS Users**

TS Users contains data about your users such as remaining licenses, site roles, and workbooks and views owned by a user.

**Example: How many licenses are being used?**

1. Connect to the TS Users data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Measure Names" to the Rows shelf and "Measure Values" to the Columns shelf.
Tableau Online Help

3. Right-click the Measure Names field in the Rows shelf and select Show Filter.

4. Click the Measure Names filter drop-down menu, and select Customize > Show Apply Button.

5. In the filter, select "Total Allowed Licenses" and "Total Occupied Licenses" check boxes, and then click Apply.

Do more with this data source: Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you’re analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID”.

- Join TS Users to Groups on “User LUID = User LUID”
- Join TS Users to TS Events on “User ID = Actor User Id”
- Join TS Users to Site Content on “User Email = Owner Email” or “User Email = Item Parent Project Owner Email”

For more information, see Aggregate, Join, or Union Data in Tableau Prep Help.

Groups

Groups identifies the group membership of users. There is one row of data for each unique combination of group and user pairing. Groups without members, and users not in a group, will be included as a row of data with null values represented as "NULL”.

Example: Which users are in a given group?

1. Connect to the Groups data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Group Name" to the Rows shelf.

3. (Optional) In the view, select the groups you want to explore, and then select Keep Only.
4. From the Data pane, drag "User Email" to the Rows shelf, placing it to the right of the Group Name field.

**Do more with this data source:** Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you’re analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID".

- Join Groups to TS Users on "User LUID = User LUID"

For more information, see Join Your Data in Tableau Desktop Help.

**Site Content**

Site Content provides essential governance information about the projects, data sources, flows, workbooks, and views on a site. The data provided about a content item may be unique to its item type. Item types with unique fields are in folders with titles that correspond to their Item Type.

**Note:** Users that connect to the Site Content data source will see data about all content items on the site, regardless of the permissions set for each item. Keep this in mind if you plan to distribute to non-administrative users.

**Example: What percent of the site's published data sources are certified?**

1. Connect to the Site Content data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Migrated Data (Count)" to the Columns shelf.

3. From the Data pane, drag "Data Source Content Type" to the Filters shelf, remove the selection next to the **All** check box, and select the **Published** check box.

4. From the Data pane, drag "Data Source Certified" to Color on the Marks card.
5. Right-click the "CNT (Migrated Data)" field in the Columns shelf and select Quick Table Calculation > Percent of Total.

**Do more with this data source:** Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you're analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID".

- Join Site Content to TS Events on “Item ID = Item ID” and “Item Type = Item Type”
- Join Site Content to TS Users on “Owner Email = User Email” or “Owner Email = Item Parent Project Owner Email"

For more information, see Aggregate, Join, or Union Data in Tableau Prep Help.

**Viz Load Times**

Viz Load Times contains the load time information for views on your site to help content authors better understand the user experience when loading views.

**Example: Which views take the longest to load?**

1. Connect to the Site Content data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Item Name" to the Rows shelf and "Duration" to the Columns shelf.

3. From the Data pane, drag "Status Code Type" to the Filters shelf and select the Success check box.

4. In the Columns shelf, right-click "Dimensions" and select Measure (Count) > Median.

**Do more with this data source:** Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you're analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID".
• Join Viz Load Times to TS Events and Site Content on “Item Repository URL = Item Repository URL”

• Join Viz Load Times to TS Events and Site Content on “Item Type = Item Type”

For more information, see Aggregate, Join, or Union Data in Tableau Prep Help.

**Job Performance**

Job Performance contains events and runtime information for background jobs on the site. Jobs include extract refreshes, Bridge refreshes, and flow runs.

**Example: How many extract refreshes and flow runs occur on the site?**

1. Connect to the Job Performance data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Item Name", "Item Type", "Owner Email", and "Job Type" to the Rows shelf.

3. In the Rows shelf, right-click "Item Name" and select Sort.

4. In the Sort window, select Sort By > Field and Field Name > Job ID. Close the window.

5. From the Data pane, drag "Started At (local)" to the Columns shelf.

6. In the Columns shelf, right-click "Started At (local)" and select Exact Date. This converts the dimension to a measure.

7. From the Data pane, drag "Job Result" to Color and "Job Execution Duration (Days)" to Size on the Marks card.

**Example: What is the average job queued duration?**
1. Connect to the Job Performance data source using one of the procedures listed in Connect to Admin Insights data.

2. From the Data pane, drag "Started At" to the Columns shelf and "Started At (local)" to the Rows shelf.

3. In the Columns shelf, right-click "Started At" and select Day from the second set of values (i.e., May 11, 2022). This converts the field to a measure.

4. In the Rows shelf, right-click "Started At (local)" and select More > Hour from the first set of values (i.e., 9).

5. On the Marks card, select Square from the Shape drop-down menu.

6. From the Data pane, drag "Job Queued Duration" to Color on the Marks card. Right-click the field and select Measure > Average.

7. From the Data pane, drag "Job ID" to Size on the Marks card. Right-click the field and select Measure > Count (Distinct).

**Do more with this data source:** Using Tableau Prep, you can join Admin Insights data sources on the following fields to get more visibility into your site. If you’re analyzing data from multiple Tableau Online sites, you must also join on "Site LUID = Site LUID".

- Join Job Performance to Site Content on "Item ID = Item ID"

For more information, see Aggregate, Join, or Union Data in Tableau Prep Help.

**Manage Admin Insights**

Admin Insights is a Tableau Online-only project that is pre-populated with carefully curated data sources and a pre-built workbook of your site’s data. Using the resources available to you through the Admin Insights project, you can create custom views to help answer a range of common questions you might have about your site.
Admin Insights versus Admin views

The Admin Insights project and the pre-built admin views (accessible from the Status page) are both valuable tools for monitoring the health and activity of your Tableau Online site. One tool does not replace the other.

To determine which tool to use, consider the following:

<table>
<thead>
<tr>
<th>Admin Insights</th>
<th>Admin Views</th>
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| • Site traffic, adoption, and reach  
  • User roles and sign-in activity  
  • Publishing-related activity | • General site activity, site performance, and disk space usage  
  • Extract performance  
  • Tableau Bridge traffic and extract-related activity  
  • Troubleshooting |

What's included with the Admin Insights project

The Admin Insights project is comprised of the following:

- **Admin Insights data sources**—TS Events, TS Users, Groups, Site Content, Viz Load Times, and Job Performance. You can use these data sources on which to create new data sources if you need to enrich the data with custom calculations or other data from your organization. For more information about the data sources, see Explore the data sources.

- **Admin Insights Starter**—a pre-built workbook that contains dashboards based on the Admin Insights data sources. These dashboards are intended to serve as templates on which to build more dashboards and views that can go more in depth and answer questions that are unique to your site's deployment or organization. For more information about the dashboards, see Explore the pre-built workbook.

- **Tableau System Account**—data sources in the Admin Insights project are updated by the Tableau System Account. While events conducted by this account are not visible in the data sources, the Tableau System Account is listed as the owner of Admin
Insights content by default. This account exists to provide Admin Insights data to your Admin Insights project.

About data freshness

The Admin Insights data sources contain up to 90 days of data about your site by default or 365 days with Advanced Management. For more information, see About Tableau Advanced Management on Tableau Online. The data sources can be updated daily or weekly. To specify the update frequency for Admin Insights data sources, go to Settings, and on the General tab, scroll to Admin Insights Update Frequency.

Because the Admin Insights Starter is based on these data sources, dashboards in the workbook always show up-to-date information. Periodically, Tableau updates the workbook itself. For more information, see Get updates to the Admin Insights Starter later in this topic.

Share access to Admin Insights

The Admin Insights content is initially visible to site admins only. Consider extending access to other site users in your organization to enable them to build, curate, and gain insight unique to their needs and workflows and ultimately help them manage their content more effectively. For more information about extending project permissions to non-site admins, see Permissions.

Move or rename the Admin Insights Starter

Tableau strongly recommends that you move the pre-built workbook, Admin Insights Starter, to a different project or simply rename it. Doing so helps ensure that your changes are preserved and do not get overwritten by periodic updates Tableau makes to the pre-built workbook.

For more information, see the Get updates to the Admin Insights Starter below.

Get updates to the Admin Insights Starter

Periodically, Tableau makes updates to the Admin Insights Starter. The updates are automatically applied to the Admin Insights Starter workbook in the Admin Insights project. The updates are summarized in the Release Notes workbook that is also available in the
Admin Insights project. Updates can include new fields or field descriptions, new views, updates to existing views, and more.

To make sure you get the latest updates to the Admin Insights Starter, and none of the changes you make to the workbook are overwritten, follow the steps described below.

**Step 1: Prepare for updates**

In order to preserve the changes you make to your workbook and avoid these changes from being overwritten by Tableau, Tableau recommends that you do one of the following tasks:

- Move the workbook to a different project
- Rename the workbook

To maintain both your changes and Tableau's latest workbook improvements, you'll need to repeat one of the above tasks after each update that Tableau makes.

**Step 2: Check for updates**

As part of its update process, Tableau recreates and then adds the Admin Insights Starter to your Admin Insights project.

If you've moved or renamed the workbook, a new "Admin Insights Starter" is added to your Admin Insights project. You can verify the new workbook by its modified date or by its publish date in revision history.

**Step 3: Use Revision History to undo changes (optional)**

If you were unable to move or rename the workbook before Tableau replaced the Admin Insights Starter, or you don't care for the update, you can use revision history to revert the changes. For more information about revision history, see Work with Content Revisions in the Tableau User Help.

**Step 4: Manually make or move your changes to the latest Admin Insights Starter**

To ensure that your changes are reflected in the same workbook as the changes made by Tableau, you'll need to follow the procedure below.
Tableau Online Help

1. In the latest version of the Admin Insights Starter workbook, you can do one or both of the following:
   - Manually make the changes that you made in your version of the workbook to the latest version of the workbook.
   - Export the sheet from your version of the workbook and save it to the latest version of workbook. For more information about exporting sheets, see Export and import sheets between workbooks in the Tableau User Help.

2. Move or rename the latest workbook again, so that any new updates Tableau makes to the Admin Insights Starter does not overwrite your changes.

Tips for managing Admin Insights

Although the Admin Insights project functions just like any other project on your site, Tableau recommends you consider the following while managing the project:

- **Move the Admin Insights Starter to a different location.** If you plan to make updates to Admin Insights Starter, Tableau recommends that you either 1) move the workbook to a different project or 2) rename the workbook. Doing one of these tasks ensures that your changes are preserved and do not get overwritten by periodic updates that Tableau automatically makes to the workbook. For more information, see Get updates to the Admin Insights Starter.

- **Use caution when moving data sources.** If you move any of the Admin Insights data sources outside of the Admin Insights project, Tableau will be unable to refresh them. The data sources are also periodically updated by Tableau. To ensure the data sources are refreshed and your changes are preserved, keep the TS Events, TS Users, Groups, Site Content, Viz Load Times, and Job Performance data sources in the Admin Insights project.

- **Designate other users, including users who are not site admins, to access and create content for the project.** For example, allow a user to create new views based on the TS Events, TS Users, Groups, Site Content, Viz Load Times, and Job
Performance data sources. For more information about changing project permissions, see Set permissions.

Traffic to Bridge Connected Data Sources

The Traffic to Bridge Connected Data Sources admin view gives the site admin the ability to see usage of data sources with live connections. This view can help you determine which data sources are most heavily used and those that are used less often. You can filter the information you see by selecting the Bridge client name, data source, and the time range.

This view gives you a snapshot of Tableau Online activity over the past 30 days.

The top of the view shows you how data sources are being used over the Time Range you specify (the default is the last 7 days):

- **What is the Data Source Usage by Project**—this shows total data source usage by project, based on the filters you set. Hover over a mark to see the number of times a data source was used. Select the mark to update the other sections of the view based on your selection.
Tableau Online Help

- **What is the Total Data Source Usage by Day**—this shows total data source usage by day, based on the filters you set. Hover 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 **Min Interactions**. 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.

**Background Tasks for Extracts**

The Background Tasks for Extracts view displays extract-specific tasks that run on the server. This view gives you a snapshot of Tableau Online activity over the past 30 days.
Understand this view

To better understand this pre-built admin view, make note of the following:

- The table, "What Extracts Ran on this Server," lists the extracts that ran in the time period specified in **Timeline**.
- You can click **Success** or **Error** to filter the table based on status.
- You can also click a specific task to update the "How Much Time did Extracts Take" graph for the selected task.
- The table, "How Many Extracts Succeeded or Failed," updates for the status (success or failure) of the task, but the count of extracts that succeeded or failed does not change.

**Status**

Tasks can have a status of success or error.

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<thead>
<tr>
<th>Icon</th>
<th>Description</th>
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<tbody>
<tr>
<td></td>
<td><strong>Error</strong>—Server was unable to complete the task.</td>
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</table>
**Tableau Online Help**

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<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄</td>
<td><strong>Success</strong>—Server completed the task.</td>
</tr>
</tbody>
</table>

**See details about a task**

For details on about the task, use your mouse to hover over the success or error icon.

**Errors in task details**

If a refresh task reaches the timeout limit, you might see one of the following errors in the task details:

- *The query time resource limit (7200 seconds) was exceeded.*
- *com.tableau.nativeapi.dll.TableauCancelException: Operation cancelled.*
- *The query time resource limit (8100 seconds) was exceeded.*

For more information about the timeout limit for refresh tasks and suggestions for resolving these errors, see Time limit for extract refreshes.

**Bridge Extracts**

The **Bridge Extracts** admin view captures the last 30-days' worth of refresh activity by Tableau Bridge.
This pre-built admin view can help answer the following questions the site admin might have about refreshes performed by one or all of the Bridge clients registered to the site:

- **Error rate:** How often are refreshes succeeding and failing? If refreshes are failing, why?
- **Requests made:** How many refreshes are scheduled?
- **Time-elapsed:** How long are refreshes taking?
- **Saturation:** How busy is each client?

You can filter the view by the client name, when the extract data source was created, the extract data source name, and the duration of the refresh.

**Notes about this view**

- If you don't see any data in the admin view, verify that you have a Bridge client associated with your site. Alternatively, change the value for the "Extract created" filter in the upper-right corner of the view.
- If you don't see the duration-based data that you expect in the view, clear the "Avg. Duration of refresh (seconds)" filter by clicking the Show All Values (×) icon.
- In the "Common extract refresh failures" table, hover over each bar to see the error and the error details. If there's more than one data source associated with the error, an asterisk (*) shows instead.
Background Tasks for Non Extracts

The Background Tasks for Non Extracts view displays tasks that the server runs that are not related to standard Online extract refreshes. For example, Bridge Refresh jobs, edited OAuth connections, subscription notifications, and so on. This view gives you a snapshot of Tableau Online activity over the past 30 days.

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 success or error. For details about the task, use your mouse to hover over the success or error icon.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✖️</td>
<td>Error—Server was unable to complete the task.</td>
</tr>
<tr>
<td>🎉</td>
<td>Success—Server completed the task.</td>
</tr>
</tbody>
</table>

Details that you can see about the task are its ID, status, priority, when it was created, started and completed. You can also see its runtime: the total run time of the background job, which includes the run time of the job plus background job overhead such as initialization and cleanup. You can also see which backgrounder the job is running on.

Stats for Space Usage

The Stats for Space Usage view can help you identify which Tableau content uses the most disk space on the server. Disk space usage displays by user, by project, and by the size of the Tableau content (workbook, data source, flow output, or virtual connection) and is rounded down to the nearest number.

Note that virtual connections require Data Management. See About Data Management for details.
To open this view, click **Site Status** on the left nav, and then under Dashboard, click **Stats for Space Usage**.

Use the **Min Size** filter to control which Tableau content displays, based on the amount of space they use.

Three bar graphs give you information about space usage on your Tableau Online:

- **Which Users Use the Most Space**—This shows the users who own data sources and workbooks that use 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.

- **Which Projects Use the Most Space**—This shows the projects with the data
sources and workbooks that use the most space. If a user or object type is selected in the Which Users Use the Most Space graph, this displays information specific to the selection.

- **Which Workbooks, Data Sources, Flows, and Virtual Connections Use the Most Space**—This shows which Tableau content uses 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:

![Image of which users use the most space]

Click on a bar to select it and update the other areas of the view based on that selection.

**Login-based License Usage**

*Note: This view is only available to site administrators and server administrators.*

The Login-based License Usage view lets server administrators view login-based license activation usage for Tableau Online or Tableau Server. The Login-based License Usage view 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 or Tableau Prep Builder license in my enterprise?
- Has a Creator role been shared or transferred?
• Has any activation activity occurred on a computer where it should not be?
• On which host is the activation being used?
• Which role is assigned to the user?
• On which Tableau product is the license in use?
• On which Tableau version is the license in use?
• Did the Creator role activate through Tableau Desktop or Tableau Prep Builder?
• Has the Creator seat been activated?
• How many Creator seats are in use?
• How many Creator seats are not in use?
• When was a Creator seat was last used?
In addition to using the login-based license usage administrative view, you can also access login-based license usage data (identity_based_activation_reporting, identity_based_activation_user_role_change, and identity_based_activation_admin_view) in the "workgroup" PostgreSQL database of the Tableau Server repository. Before you can access this data, you must enable access to the Tableau Server repository.

Filters

On the report screen, you can change the time window to show when seats were last used, filter on actions, filter on user name, and sort by columns.

- **Time Window in Days.** Enter the number of days for which to view login-based license management activated client usage data. You can view data for the past 30 days up to a maximum of 183 days.

- **(All).** Apply all filters to the view.

- **Activated.** Show Creator users that have activated using login-based license management.

- **in use.** Show Creator users who activated using login-based license management whose seats are in use.

- **last used.** Show when the login-based license management client was last used.

- **unassigned.** Show which login-based license management activated Creator seats are currently unassigned.

- **user name.** Show login-based license management activations in use by the specified user.

When you hover over the filter card, 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:
Which creator seats are in use in the last <nn> days?

This area of the dashboard shows a list of three types licenses (activated, in use, and unassigned). Hovering over an activated, in use, or unassigned mark gives you information including the registered user of the copy of Tableau. Click a column head to sort the list.

Which creator seats 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.

Stale Content

The Stale Content view can be used to identify content that hasn’t been used or accessed in the specified time period (displayed as Stale Access Threshold). You can set that time period in days. The minimum value for the time period is 1 day and the maximum is 120 days.

This view also provides the information about the disk space used by stale and active content.

In previous versions of Tableau Server, admin views were all displayed in the same workbook, in separate tabs. However, the two new admin views are displayed as separate workbooks and not part of the existing admin view workbook. You can navigate to the new admin views.
A - At the top of the view, you will see a statement that summarizes the amount of space that is used by stale content compared to the total space used. The total space used is defined as the sum total of disk space used by active and stale content.

B - This summary is followed by a chart that gives you a further breakdown of the types of stale content and content that is considered active - meaning content that has been
accessed in the time period below the stale threshold. You can click on the bar chart and apply it to filter the data displayed in the view.

C - You can see and apply additional filter options by clicking the filter icon. This filter pane includes:

• Stale Threshold

• Site

• Project

• Content Owner

• Size

• Content type
These filters are applied to the entire view.

Details

The Stale Content view has three sections as described below that provides details:

1. **The top left section** shows you the total space used for the selected content. The x-axis shows the number of days that have passed since the content was last opened, and the y-axis shows you the size. The graph also shows the stale threshold.
Set your desired staleness threshold, then use this view to identify content that is the most stale. Click the **Stale Workbooks** or **Stale Datasources** in the bar at the top to filter to the content of interest. Select the marks to the right of the **Stale Access Threshold** to see more details about content. The details are displayed in the bottom left section.

---

**What is the total space used by all stale content?**

---

2. **The top right section** shows you the amount of space that is used by each selected content. For example, if you select Stale workbooks, the space used by each stale workbook is displayed. You can use this section to find out which content is the most stale, or is taking the most space.

This section helps you identify content that hasn’t been used in a long time. Click the **Stale Workbooks** or **Stale Data Sources** on the bar at the top. Select the oldest set of unused content (marks further to the right) to see more details. The details are displayed in the bottom left section. This can be your next set of content to consider for archiving or deleting as these are contents that nobody has been using, regardless of size.
3. The section at the bottom shows detailed information about the selected content as shown below:

<table>
<thead>
<tr>
<th>Content details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Workbook</td>
</tr>
<tr>
<td>Workbook</td>
</tr>
<tr>
<td>Workbook</td>
</tr>
</tbody>
</table>

Archive or Delete Stale Content

Starting in 2020.3, the Stale Content admin view includes a feature that allows you to select and tag content as stale. You can select content from either the section at the bottom or the top right section. When you make a selection, you will see the number of objects and the type of content that are selected, as seen in the screen shot below. Click the **Tag Objects** button to tag the selected content.

In the screen shot shown below, content that has not been opened in the last 160 days or more are selected to be tagged as stale content.
To find all the tagged content, on Tableau Server web interface, navigate to Explore. Select the Stale Content filter to see all the content that have the stale content tag. You can now select the content and either move it to a project that you use for archiving or delete the content.
Ask Data Usage

The Ask Data Usage view is a pre-built dashboard that allows site or server admins to see and understand the usage patterns and value of Ask Data for a site. Admins can see the growth of engagement with Ask Data and monitor the results of internal training or roll-outs. The dashboard highlights the top Ask Data users, data sources, and data source owners, along with some headline value metrics.
To enable Ask Data, see Disable or Enable Ask Data for a Site.

Explore the dashboard

The Ask Data Usage view provides information about Ask Data across the entire site. You can use the following metrics to understand user engagement and help drive self-service analytics adoption in your organization.

At the top of the dashboard, three headline metrics provide an overview of Ask Data usage on the site.

- **Number of Users on Ask Data** - This shows the total number of Ask Data users on the site.

- **Number of Queries on Ask Data** - This shows the total number of Ask Data queries issued on the site.

- **Number of Data Sources Used with Ask Data** - This shows the total number of data sources used with Ask Data.

In the middle of the dashboard, two line charts show you how Ask Data is used over time.

- **Distinct Users Over Time** - This shows the distinct number of Ask Data users over time.

- **Distinct Data Source Owners Over Time** - This shows the distinct number of data source owners over time.
At the bottom of the dashboard, three bar charts list the top Ask Data users, data sources, and data source owners.

- **Top Ask Data Users** - This lists the top Ask Data users and the total number of queries issued by each user.

- **Top Ask Data Data Sources** - This lists the top Ask Data data sources and the total number of queries issued for each data source.

- **Top Ask Data Data Source Owners** - This lists the top Ask Data data source owners and the total number of data sources owned by each user.

**Data Quality Warning History**

When Tableau Catalog is enabled in your environment, site administrators can see how data quality warnings are being used on the site using the pre-built admin view, Data Quality Warning History.

For more information about Tableau Catalog, part of Data Management, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.

From the Site Status page, select the Data Quality Warning History dashboard:
The dashboard shows how many data quality warnings are active over a period of time. It also shows how many warnings have been changed (created, updated, and deleted) over that same time period.

See warning details

Under the line charts are the details about the data quality warnings, including:

- **Date and Time** - When the warning was created or last changed.
- **Content Type** - The type of asset on which the warning is set. For example, database, table, data source, or flow.
- **Content Name** - Name of the asset on which the warning is set.
- **Changed By** - Name of the person who created or last changed the warning.
- **Status** - If the warning is active or inactive.
- **Type** - Warning type can be Stale data, Warning, Deprecated, Sensitive data, or Under maintenance.
- **Visibility** - The warning can be configured to have normal (the default) or high visibility.
- **Message** - The message the warning creator wrote to display to users when they see the details of the warning.
Filter warning history

When you review data quality warning history, you can click a mark on the view to filter the details shown below the view.

The numbers on the Day axis represent the date within the time range. For example, if today is November 18, and you filter for the last 7 days, the Day axis shows 12-18.

More filters are available when you click the filter icon in the upper right corner: filter by time range and by content type.

Filter by time range

The maximum time range you can configure is the past 30 days.
Filter by content type

You can see all the data quality warnings on your site, or you can filter to see warnings for specific types of assets, like data source or table:

Who can do this

To set a data quality warning, you must be a server or site administrator.

Administrative Views for Flows

Administrative views can be used to monitor the activities related to flows, performance history, and the disk space used. The **Status** page contains an embedded Tableau workbook
with various administrative views that can be used to monitor different types of server or site activity.

Who can do this?

Tableau Site administrators can view and work with Administrative Views.

Action by all users

Use this view to gather insight into how flows are being used. This includes actions like publish, download, and flow runs. You can filter the view by actions, by site, and by time range. 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 users who have been active during the selected time period and performed one of the selected actions.

Action by Specific User

Use this view to gather insights about how an individual user is working with flows. You can filter the view by user name, the type of action, and by time range.
**Action by Recent Users**

This view shows you which users have been active on Tableau Online over the past 24 hours.

This can be useful if you need to do some maintenance activity on the server and want to know which users and how many this will affect, and what they’re doing.

The view shows **Active, Recently Active, and Idle** users that are currently signed in to Tableau Online.

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.

Select a user to see only the actions that user performed recently. Hover over an action to see details of the action.
Backgrounder Task Delays

This view shows the delay for extract refresh tasks, subscription, and flow 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 identify places you can improve server performance by distributing your task schedules and optimizing tasks.

Possible reasons for the delays and ways to reduce the delays include the following:
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. You can set the Timeline filter to a single day to view task delays by hour and identify the hours of the day when many tasks are scheduled at the same time. One solution is to distribute the tasks to off-peak hours to reduce load on the server.

**Background Tasks for Non Extracts**

Background Tasks are created to run flows (scheduled and ad hoc). You can use this view to see how many flow tasks succeeded or failed on this site. For details on a task, hover over its icon.

**Performance of Flow Runs**

Use this view to see the performance history for all the flows on a site. You can filter by Flow Name, Output Step Name, Flow Owner, Run Type (Scheduled or Ad Hoc), and the time the flow runs were started.
Questions you can answer using this view include:

- **What flow tasks are currently scheduled?** – To do this, use the Start Time filter and select the time frame you want to look at. For example, to see flow tasks that are scheduled in the next 3 hours, select **Hours -> Next ->** and enter **3**.

- **What is the duration of flow tasks?** - To answer this, click on a mark in the view to see details, including the task duration.

- **How many flows were run ad hoc, and how many were scheduled runs?** - To answer this, use the **Run Type** filter and select **Ad hoc** or **Scheduled**.

This view can also show you the following information:

- Flows with the highest run frequency have the most marks.

- To see flows that are currently running at the same time, hover over a mark that shows “**In Progress**” or **“Pending and select “Keep Only”** to filter all flow runs that are currently running.

- To see flows that are running at the same time during a specific time range, select a range for the **Start Time** filter. For example, select “**Next three hours**” to see which flows will be running in the next three hours.

**Stats for Space Usage**

Use this view to identify which flow outputs are taking up the most disk space on the server. Disk space usage is displayed by user, project, and by the size of flow output and is rounded down to the nearest number.
Use the Min Size filter to control which flow outputs are displayed, based on the amount of space they take up. Use the object type filter for flows.

- **What Users Use the Most Space** – This section shows the users who own flows (when filtered for flows) that are taking up the most space. Click a user name to filter the next two graphs for that user.

- **What Projects Use the Most Space** – This section shows the projects with flows (when filtered for flows) that are using the most space.

- **What Workbooks, Data Source and Flows Use the Most Space** – This section shows the flows (when filtered for flows) that take up the most space.

Who can do this

- **Tableau Site Administrators:**
  - Set up email notifications at the site level
  - View errors
  - Resume suspended tasks
  - View alerts

- **Flow owners, project leaders and any user who is granted permissions to view the flow:**
  - View errors
  - Resume suspended tasks
  - View alerts (Flow owners)
Notify Owners When Extract Refreshes Fail

A scheduled extract refresh can fail to complete for a variety of reasons, such as outdated embedded credentials or file path. For scheduled refreshes that run directly from Tableau Online, after a refresh has failed five consecutive times, Tableau Online suspends the schedule until a site admin or the data source owner takes an action to address the cause.

A site admin can enable Tableau Online to send email to the owner of a data source when its scheduled extract refresh does not complete successfully. The data source owner can then opt out individually in their account settings.

The email contains the following information:

- Extract or workbook name.
- The date and time of the last successful refresh. Or, if the last refresh was longer than 14 days ago, the email shows “not in the last $N$ days.”
- The number of consecutive times the refresh has failed.
- A suggested action to take to address the cause of the failure, such as updating embedded credentials or a file path, and a link to Tableau Online to take the action.

When receiving email about data sources refreshed by Tableau Bridge, there will be some differences. For more information, see Differences for Tableau Bridge refreshes later in this topic.

Enable refresh failure emails

As a site admin, you have the ability to enable (or disable) refresh failure emails for your site using the procedure below. If you opt in, each user can potentially opt out from receiving refresh failure emails from his or her individual account.

1. Sign in to Tableau Online as a site admin and click Settings.
2. Under Manage Notifications, select or clear the Flow runs and Extract jobs.
check boxes under the **On Tableau** and **Email** columns.

**Differences for Tableau Bridge refreshes**

For data sources that are refreshed through Tableau Bridge, notifications will vary. For more information, see Manage Email Alerts for Bridge.

**Manage Users and Groups**

You can add users to your Tableau Online site and set their site roles, which determines each user’s level of access. To make it easier to manage multiple users, you can organize users into groups.

**Add Users to a Site**

Everyone who needs to access Tableau Online—whether to browse, publish, edit content or administer the site—must be added as a user. Administrators have the following options for adding users:

- Enter users’ email addresses individually.
- Import Users via a CSV file that you create using the CSV Import File Guidelines.

**Add users**

1. When you’re signed in to the Tableau Online site, select **Users**.
2. On the **Users** page, click **Add Users**, and then click **Enter Email Addresses**.
3. If Google or SAML authentication is not enabled on this site, skip to the next step.

If Google or SAML authentication is enabled on this site, you can select the authentication type for the new users.

- Select Add users for [Google/SAML] authentication if you enabled your site for Google or SAML authentication and want the imported users to sign in to the site through an external identity provider.

- Select Add users for Tableau authentication if you want these users to have the default email address and password authentication.

You can go to the Users page to change users’ authentication type any time after you add them.

**Note:** To work with Tableau Online by way of tabcmd, the Tableau Data Extract Utility, or the Tableau APIs, users must authenticate with a TableauID account.

4. In the Enter email addresses box, enter the users’ email addresses. If you add more than one user, separate each address with a semicolon.
For example, tdavis@example.com; jjohnson@example.com; hwilson@example.com

5. Select a site role from the drop-down list, to assign that site role to all users you’re adding.

For site role definitions, see Set Users’ Site Roles.

6. Click **Add Users**.

If a new user’s email address is already associated with an account on tableau.com, the user is prompted to sign in using the existing email address and password for that account.

If a new user’s email address is not already associated with an account on tableau.com, the user is prompted to provide a first and last name and password.

Until the user provides these values, their entry in the Tableau Online user list shows the email address preceded by a period. For example:

.snguyen@example.com

After the user signs in, the entry is updated to show the full name. For example:

Susan Nguyen

**Set Users’ Site Roles**

When you add users to a site on Tableau Online, independent of their license type, you must apply a site role to them. The site role signifies the maximum level of access a user can have on the site. Along with content permissions, the site role determines who can publish, interact with or only view published content, or who can manage the site’s users and administer the site itself.

**How user licenses, site roles, and content permissions work together**

The intersection of a user’s license type, site role, and content permissions determines the level of access a user has on the Tableau site.
Tableau Online Help

1. The license type is associated with the user. The site role you want to assign to the user determines the license type they require.

   If a user is a member of multiple Tableau Online sites, they must have a license for every site they belong to.

2. The site role is also set at the user level. If a user is a member of multiple Tableau Online sites, they will have independent site roles. For example, the same user can have the Site Administrator Creator site role on one site and the Viewer site role on another site.

   The site role defines the maximum capabilities the user can have.

3. Whether the site role’s maximum capabilities are available to the user depends on the permissions set on the content resources (projects, data sources, workbooks).

   For example, let’s say that a user has the following access on a site:

   - Creator license
   - Explorer site role
   - Save permission capability on a project

   In this scenario, the license allows connecting to and creating new data sources in the web editing environment or Tableau Desktop, and a permission rule allows them to save in a project. However, their site role prevents them from being able to save, so their effective permissions don’t include the save capability. Therefore, the user can’t publish content to the site.

   Even if a user has a creator license and a creator site role, if they don’t have the save capability on at least one project, they can’t publish anything to the site.

   For more information, see Permissions.
Change a user’s site role

1. Sign in to the site as a site administrator, 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. For more information, continue to General capabilities allowed with each site role.

General capabilities allowed with each site role

The following table lists the license types as of version 2018.1, the highest level of site role allowed with each, how each site role maps to its pre-2018.1 equivalent; and summarizes the maximum capabilities each site role allows.

Note: This information focuses on site roles and is more generalized. For a list of common specific tasks available per license role, see the matrix on the For Teams & Organizations tab on the Tableau pricing page.

Tableau site roles as of version 2018.1

<table>
<thead>
<tr>
<th>Site role name as of version 2018.1</th>
<th>Previous site role name</th>
<th>Maximum capabilities this site role allows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site roles that use a Creator license</td>
<td></td>
<td></td>
</tr>
<tr>
<td>—Users with these site roles have access to Tableau clients such as Tableau Prep, Tableau Desktop, Tableau Bridge, and Tableau Mobile.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Server Administrator</td>
<td>Server Administrator</td>
<td>Available on Tableau Server only; not applicable to Tableau Online.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This site role always occupies the highest license activated on the server between Creator and Explorer. It allows unrestricted access to the configuration settings for the Tableau Server browser environment, all sites on the server, users and groups, and all content assets, such as flows, pro-</td>
</tr>
<tr>
<td>Site role name as of version 2018.1</td>
<td>Previous site role name</td>
<td>Maximum capabilities this site role allows</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>jects, data sources (including connection information), and workbooks. Connect to Tableau published data sources or external data, from the browser, Tableau Desktop, or Tableau Prep; create and publish new data sources; author and publish workbooks.</td>
</tr>
<tr>
<td>Site Administrator Creator</td>
<td>--</td>
<td>This is the highest level of access for Tableau Online. Unrestricted access to content as described above, but at the site level. Connect to Tableau or external data in the browser, Tableau Desktop, or Tableau Prep; create new data sources; build and publish content. On Tableau Server, server administrators can determine whether or not to allow site administrators to manage users and assign site roles and site membership. By default, on Tableau Server, and always on Tableau Online, site administrators are allowed these capabilities.</td>
</tr>
<tr>
<td>Creator</td>
<td>--</td>
<td>This is similar to the former Publisher site role, but allows new features. This site role offers non-administrators the maximum level of content access. Connect to Tableau or external data in the browser, build and publish flows, data sources and workbooks, have access to Dashboard Starters, and use</td>
</tr>
</tbody>
</table>
### Site roles that use an Explorer license

—Users with these site roles can access the server from the browser or Tableau Mobile.

<table>
<thead>
<tr>
<th>Site role name as of version 2018.1</th>
<th>Previous site role name</th>
<th>Maximum capabilities this site role allows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction features on published views. Can also connect to data from Tableau Prep or Tableau Desktop, publish (upload/save) and download flows, workbooks and data sources.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Server Administrator | N/A | Tableau Server only; not applicable to Tableau Online.  
If Explorer is the highest license type activated on the server when a new server administrator user is created, the user’s site role is Server Administrator. However, the user won’t have the full connecting and publishing capabilities that come only with the Creator license.  
With the Explorer license a Server Administrator has unrestricted access to the configuration settings for the Tableau Server browser environment, all sites on the server, users and groups, and all content assets, such as projects, flows, data sources (including connection information), and workbooks.  
However, with the Explorer license, a Server Administrator can’t connect to external data from the browser to create a new data source. They can author or publish workbooks and data sources from Tableau Desktop. With regards to publishing, they... |
<table>
<thead>
<tr>
<th>Site role name as of version 2018.1</th>
<th>Previous site role name</th>
<th>Maximum capabilities this site role allows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Administrator Explorer</td>
<td>Site Administrator</td>
<td>Same access to site and user configuration as Site Administrator Creator, but can’t connect to external data or virtual connections from the web editing environment. Can connect to Tableau published data sources to create new workbooks, and edit and save existing workbooks. Can't publish Tableau Prep flows.</td>
</tr>
<tr>
<td>Explorer (can publish)</td>
<td>Publisher</td>
<td>Can publish workbooks from the web using existing data sources, browse and interact with published views, and use all interaction features. In the web editing environment, can edit and save existing workbooks. Can’t save new standalone data sources from data connections embedded in workbooks, and can’t connect to external data or virtual connections, or create new data sources. Can't publish Tableau Prep flows.</td>
</tr>
<tr>
<td>Explorer</td>
<td>Interactor</td>
<td>Can browse and interact with published views. Can subscribe to content, create data driven alerts, connect to Tableau published data sources and open workbooks in the web authoring environment for ad-hoc queries, but they can’t save their work. Can’t connect to a virtual connection. Can't publish Tableau Prep flows.</td>
</tr>
<tr>
<td>Site role name as of version 2018.1</td>
<td>Previous site role name</td>
<td>Maximum capabilities this site role allows</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Read Only</td>
<td>Viewer</td>
<td>Prep flows.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This site role is available only in version 2018.1, for transitioning users to the user-based Viewer (or other) license and site role. Any users in the Read Only site role prior to upgrading to version 2018.2 or later are reassigned to the Viewer site role. In 2018.1 versions, Read Only users can see and subscribe to published views others have created. Can’t use other interaction features or save custom views.</td>
</tr>
<tr>
<td><strong>Site roles that use a Viewer license</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewer</td>
<td>N/A</td>
<td>Can see published views others have created and use most interaction features. Can subscribe to views and download as images or summary data. Can’t connect to data, create, edit, or publish content, or set data alerts. For a list of specific capabilities, see the <strong>Viewer</strong> column in the matrix on the <a href="https://www.tableau.com/pdfs/price-list.pdf">Tableau pricing page</a>. <strong>Note:</strong> Although the Viewer site role existed in previous versions, the new Viewer site role has additional capabilities.</td>
</tr>
<tr>
<td><strong>Other site roles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlicensed</td>
<td>Unlicensed</td>
<td>Unlicensed users can’t sign in to Tableau Server or Tableau Online. Users are assigned the Unlicensed</td>
</tr>
<tr>
<td>Site role name as of version 2018.1</td>
<td>Previous site role name</td>
<td>Maximum capabilities this site role allows</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>role in the following circumstances:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- You import users from a CSV file and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>their license level is set to unlicensed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The number of available licenses is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reached at the time you add or import</td>
</tr>
<tr>
<td></td>
<td></td>
<td>users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- You remove a user who owns content on</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the site. The user will still own the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>content but not be able to do anything</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with it.</td>
</tr>
</tbody>
</table>

Who can publish content

The following site roles allow the specified level of publishing access.

- **Server Administrator** (Tableau Server only); **Site Administrator Creator**; and **Creator** allow full connecting and publishing access.

  This includes connecting to data and publishing new flows, new workbooks and new data sources from Tableau Desktop and the web editing environment. The site roles also allow editing and saving existing published workbooks, or publishing updates to existing data sources.

- **Explorer (Can Publish)** and **Site Administrator Explorer** have limited publishing capabilities, as described in General capabilities allowed with each site role.

- **Explorer**, **Viewer**, **Read Only**, and **Unlicensed** don’t allow publishing.
View, Manage, or Remove Users

Administrators can manage a site’s users such as adding and removing users, setting the groups they’re members of, setting their site roles, and so on.

View and manage users on a site

Sign in to a site as an administrator, and then select Users. On this page you can do any of the following to manage users:

- Set group membership, set site role, or remove the user from the site. If you’ve configured the site for SAML single sign-on, you can set the selected users’ authentication type.

- Select a user name to see details about them, such as content they own, views they subscribe to, and their account settings.

Search for users

To search for a specific user

Use the filter toggle in the upper right to display the search box and site role filter. Then use the search box or filters to find the users you want.
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 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 the user will not be removed.

If the default All Users group has enabled Grant site role on sign in, that user's content must be reassigned to another user or removed before they can be unlicensed or removed. For more information on Grant role on sign in, see Removing users affected by Grant role on sign in. For more information on changing content ownership, see Manage Content Ownership

**Note:** On Tableau Server, when an administrator removes a user from a site (and the user belongs only to that one site), the user is also deleted from the server.
1. Sign in to a site as an administrator, and go to the Users area. Select one or more users to remove, and then select Actions > Remove.

2. Click Remove in the confirmation dialog.

Set the User Authentication Type

On a Google or SAML-enabled site, administrators can specify users' authentication type. For example, which users can access Tableau Online using their single sign-on credentials.

You can assign authentication type at the time you add users to Tableau Online, as well as any time afterward.

1. When you’re signed in to the Tableau Online site, select Users.

2. On the Site Users page, select the check boxes next to the users you want to assign an authentication type.

3. On the Actions menu, select Authentication.
4. In the Authentication dialog box, select **Google** or **Tableau with MFA**.

**Notes**

- If you change users’ authentication from Tableau with MFA to Google, the next time they sign in, they will be directed to your identity provider’s site to provide their credentials.

- If users were signing in using their external Identity Provider credentials, and you change their authentication type to Tableau, if they do not have existing Tableau credentials, they will receive email from Tableau with instructions for creating new Tableau credentials.

- Tableau recommends that you dedicate a site administrator account that is always configured for Tableau with MFA authentication. In the event of an issue with your Identity Provider, a dedicated Tableau account ensures that you always have access to your site.

- See Multi-Factor Authentication and Tableau Online for more information about the **Tableau with MFA** authentication option.

**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. When you import the CSV file, you also specify the users’ authentication type.
Site administrators can import users to a particular site; server administrators (Tableau Server only) can import users at the server level, to later add them to multiple sites.

**Note:** This topic contains the steps for importing, assuming that you have already created the CSV file. If you have not created the file yet, see CSV Import File Guidelines for a list of file format requirements and import options.

**Add users from a CSV file**

1. When you’re signed in to the Tableau Online site, select **Users**.

2. Click **Add Users**, and then click **Import From File**.

   ![Add Users to Site dialog](image)

   The options you have in the Import Users dialog box depend on how users sign in to the site.

3. If Google or SAML authentication is not enabled on the site, skip to the next step.

   If Google or SAML authentication is enabled on the site, you can select the authentication type for the new users.

   - Select **Add users for Google authentication** if you enabled your site for Google or SAML authentication and want the imported users to sign in to
Tableau Online through an external Identity Provider.

- Select **Add users for Tableau authentication** if you want these users to have the default email address and password authentication.

4. For **File name**, click **Browse**, navigate to the CSV file, and click **Open**.

5. To see account-specific information, select **View Details**.

To continue, click **Import Users**, and then click **Exit** in the final dialog box.

If a user already exists in the Tableau Online site, and the import file defines a different site role for them, they will get the new site role as defined in the CSV file, even if it is more restrictive than their current site role. This includes existing site administrators.

**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 license level and the publishing access, to apply to the users at the same time you import them.

To import users, you can use the site administration page or the **tabcmd utility**. Using **tabcmd** provides an option for assigning a site role to all users in the CSV file. For information, see **Import Users or createsiteusers filename.csv**.

**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 Online assumes that every line in the file represents a user.

- The file is in UTF-8 format, and includes the byte-order mark (BOM).
Tableau Online Help

- 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 user name includes an @ character that represents anything other than a domain separator, you need to refer to the symbol using the hexadecimal format: \0x40

  For example, `user@fremont@mycompany.com` should be `user-\0x40fremont@mycompany.com`

**Required columns in the CSV file**

The following value is required for each user:

- User name: The user’s email address.

**Additional CSV column options**

For each user, the CSV file can contain the following fields. Where indicated, Tableau Online does not use the field, but it must be accounted for in the file.

- User name. The user’s email address. This is the only required column.

- Password. Tableau Online does not use this field, but you need to delimit it in each row to position the subsequent fields correctly.

- Display name. Tableau Online does not use this field, but you need to delimit it in each row to position the subsequent fields correctly.

- License level. This can be **Creator**, **Explorer**, **Viewer**, or **Unlicensed**.

- Administrator level. This can be **Site** or **None**.

- Publishing capability. Acceptable values are **Yes/True/1** or **No/False/0**.

**CSV file sample entries**

The following example shows a user who will be granted the **Explorer** site role, will not be a site administrator, and will be able to publish to projects on which they have the appropriate
content permissions.

user1@domain.com,,Explorer,None,true

By changing the administrator-level column, you can import the following user as a site administrator with the Site Administrator Explorer site role.

adminuser@domain.com,,Explorer,Site,true

Notes

- If the CSV file contains only user name values (email addresses), the users will receive an email invitation to the site. Users can join the site to create their accounts, but the accounts remain unlicensed until an administrator configures the accounts (display name, license level, and so on).

- The password (second value) and display name (third value) fields are not used by Tableau Online. Values you do specify for those fields are ignored.

  However, if you want to set the license and publish access for the users, your file still needs to include delimiters for these fields, as shown in the example earlier.

- New users must select a password and a display name when they first sign in to Tableau Online. If users already have a Tableau account, such as for the Tableau Community forums, they already have passwords.

- The CSV file does not include a field for setting authentication type (Tableau, Google, or SAML). You specify this in Tableau Online when you import the file. The setting applies to all imported users, and you can change authentication type for individual users afterward.

  **Note:** Alternatively, you can use `tabcmd` to import users and set the authentication type and site role that applies to all users in the CSV file. For information, see `createsiteusers filename.csv`. 
CSV settings and site roles

The license level, administrator, and publishing settings for a user determine how the user’s site role is set during the import process. 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) Administrator=System Publisher=true</td>
<td>Server Administrator. This setting applies to Tableau Server only, and it is valid only if you are importing users while managing the server (that is, not signed in to a specific site).</td>
</tr>
<tr>
<td>License level=Creator or Explorer Administrator=Site Publisher=true</td>
<td>Site Administrator Creator or Site Administrator Explorer. This setting is valid only if you are importing users while signed in to a specific site.</td>
</tr>
<tr>
<td>License level=Creator Administrator=None Publisher=true</td>
<td>Creator</td>
</tr>
<tr>
<td>License level=Explorer Administrator=None Publisher=true</td>
<td>Explorer (Can Publish)</td>
</tr>
<tr>
<td>License level=Explorer Administrator=None Publisher=false</td>
<td>Explorer</td>
</tr>
<tr>
<td>License level=Viewer</td>
<td>Viewer</td>
</tr>
<tr>
<td>CSV settings</td>
<td>Site role</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Administrator=None</td>
<td></td>
</tr>
<tr>
<td>Publisher=false</td>
<td></td>
</tr>
<tr>
<td>License level=Unlicensed</td>
<td>Unlicensed</td>
</tr>
<tr>
<td>Administrator=None</td>
<td></td>
</tr>
<tr>
<td>Publisher=false</td>
<td></td>
</tr>
</tbody>
</table>

**Manage Site User Visibility**

By default, all site users can see aliases, project ownership and comments by other users when permissions allow. The User Visibility setting lets administrators manage if users with Viewer and Explorer site roles see other users and groups on the site, which can be important for sites that are used by multiple clients. To learn more about site roles, see Set Users’ Site Roles.

**Limit user visibility**

Setting User Visibility to **Limited** impacts certain collaboration tools and hides user information in Tableau Online and Tableau Server. Limited User Visibility either disables the feature for Viewers and Explorers (excluding Site Administrator Explorers), or removes user information from other areas. Note that Creators and administrators will still see user information when User Visibility is set to Limited.

To limit user visibility for Explorers and Viewers (excluding Site Administrator Explorers):

- Navigate to the site's Settings page
- Select **Limited** in the **User Visibility** setting

The following is a list of site areas impacted when User Visibility is set to Limited. Unless noted that the feature is disabled for all users, only non-administrator Explorers or Viewers are impacted.
<table>
<thead>
<tr>
<th>Area</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search</td>
<td>User information not displayed</td>
</tr>
<tr>
<td>Content owners</td>
<td>User information not displayed (Explorers and Viewers can’t see themselves, but can see their content in My Content)</td>
</tr>
<tr>
<td>Profile pictures</td>
<td>User information not displayed</td>
</tr>
<tr>
<td>Subscriptions</td>
<td>User information not displayed</td>
</tr>
<tr>
<td>Recommendations</td>
<td>Similar users not displayed (all users)</td>
</tr>
<tr>
<td>Add/Edit Tags</td>
<td>Explorers and Viewers can see tags but cannot delete or modify them</td>
</tr>
<tr>
<td>&quot;Who has seen this view?&quot;</td>
<td>Disabled</td>
</tr>
<tr>
<td>Ask Data usage analytics</td>
<td>Disabled</td>
</tr>
<tr>
<td>Permissions dialogs</td>
<td>Disabled</td>
</tr>
<tr>
<td>Named sharing</td>
<td>Disabled (all users)</td>
</tr>
<tr>
<td>Alerts</td>
<td>Disabled (all users)</td>
</tr>
<tr>
<td></td>
<td>Existing alerts paused</td>
</tr>
<tr>
<td>Comments</td>
<td>Disabled (all users)</td>
</tr>
<tr>
<td>Public Custom Views</td>
<td>Disabled (all users)</td>
</tr>
<tr>
<td></td>
<td>Existing public custom views appear as private</td>
</tr>
<tr>
<td>Request Access</td>
<td>Disabled (all users)</td>
</tr>
</tbody>
</table>
Tableau Desktop  
Publishing workbooks disabled from Desktop  
User information not displayed on user filters

Tableau Catalog (with Data Management)  
User information not displayed

When User Visibility is set to Limited, Tableau Server REST API and Metadata API calls behave as described in the table above.

Users on a site can interact with views and modify them, such as applying filters. If that user shares their modified view with others, or if the user creates something from that modified view (like a metric or a private custom view), then that user's name appears in the URL. Make sure that the URL for this modified view is only distributed to users who are permitted to see that person's name.

**Note:** If a user is a member of multiple sites, entering an email on the sign in page for Tableau Online will return the names of all sites the user is a member of.

Best practices for limiting user visibility

Administrators can also check that user and group information is not visible in these ways:

- Configure permissions to only provide content to appropriate parties. For more information, see Permissions.
  - Limited User Visibility hides user identification information from search, but might return content that the user published, including when searching by owner name, if the person searching has viewing permission to that content.
  - A user publishing a workbook with a duplicate title in the same project might see a warning that a workbook with that title already exists.
- Apply row-level security when necessary.
- Check that metadata within dashboards does not contain user information.
- Check that calculations accessible to users don't contain user metadata (e.g., user filters).
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Restore Full User Visibility

When administrators set User Visibility back to Full, features disabled for all users by Limited User Visibility (such as comments and alerts) remain off. Administrators can re-enable these features through the site's Settings page.

Any previous feature settings are not retained when User Visibility is set to Full, and affected features are not automatically turned on.

Enable Support Access

Tableau Online administrators can allow approved Tableau Support technicians to access their Tableau Online site to help troubleshoot a customer support case. By default, this feature is disabled for all sites. Enable the feature to allow support access.

1. In a web browser, sign in to Tableau Online as a site administrator and go to the site in which you want to enable support access.
2. From the navigation panel, click Settings.
3. Under Tableau Support Access, select Let Tableau Support access your site.
4. Click Save.

When enabled, Tableau Support technicians are assigned the Support User role and granted administrator-level access to your site and its content. Tableau Support technicians use this access to gather information to diagnose and reproduce issues. Tableau Support technicians do not make changes to your site unless you authorize them to do so.

Only Tableau Support technicians can be assigned the Support User role. You cannot add this role to new or existing site users. Users assigned the Support User role do not count against the site's user limit. To view users who have the Support User role on the site, click the Users tab.

Disable Support Access

When you disable support access, users with the Support User role who are signed on to the site are automatically signed out. If you do not disable support access, users with the Sup-
port User role will be automatically deleted after 16 days. Any content owned by the Support User will be reassigned to the longest-tenured site administrator.

Create a Group and Add Users to It

You can organize Tableau Online users into groups to make it easier to manage multiple users.

Create a group

1. In a site, click Groups, and then click New Group.

2. Type a name for the group.

   ![New Group](image)

   Optionally, select Grant role on sign in and select a minimum site role for the group. For more information, see Grant License on Sign In.

3. Click Create.

**Note:** The All Users group exists in every site by default. Every user added to the server becomes a member of the All Users group automatically. You cannot delete this group, but you can set permissions for it.
Add users to a group (Users page)

1. In a site, click **Users**.

2. Select the users you want to add to the group, and then select **Actions > Group Membership**.

3. Select the groups and then click **Save**.

Add users to a group (Groups page)

1. 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.

Grant License on Sign In

Grant license on sign in (Grant role on sign in) lets unlicensed users in specific groups become licensed when they sign into a Tableau site. This streamlines license provisioning for administrators and removes the user’s need to request a license before using Tableau.

For more information about site role capabilities and minimum site roles, see Set Users’ Site Roles.
For example, imagine that your company has 100 people in the Marketing group, but only 25 members need to access Tableau Online. The Tableau Online administrator isn't sure which 25 need Tableau. That administrator can create a Marketing user group with an Explorer minimum site role, select **Grant role on sign in**, and add all 100 Marketing members to the group. Instead of provisioning licenses to the entire group, the 25 Tableau users in Marketing are provisioned Explorer licenses when they sign in to their Tableau Online site. Those who don't need Tableau Online remain unlicensed unless they sign in.

**Note:** For more information about benefits and best practices, see [Grant Role on Sign In](#) in Tableau Blueprint, Tableau's planning tool for data-driven organizations.

### Activate Grant role on sign in

You can enable Grant role on sign in on new or existing groups. The following steps walk through how to use Grant role on sign in to add new users that are eligible for a license but may not consume one. This may be the case when your company has a lot of eligible users, but limited Tableau licenses.

1. In a site, add a new group:
   - Click **Groups**, and then click **New Group**.
   - Add a group name.

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Select **Grant role on sign in** and select a minimum site role for the group. This setting means licenses and site roles will only be provisioned to group users who sign into this Tableau Online site.

- **Click Create.**

2. Add users to a site, either by entering users’ email addresses individually, or Import Users via a CSV file that you create using the CSV Import File Guidelines.

- Enter email addresses if adding individually. For information on using Google or SAML authentication when adding users, see Add Users to a Site.

  If you add more than one user, separate each address with a semicolon.
For example, tdavis@example.com; jjohnson@example.com; hwilson@example.com

- Set the site role for those users to **Unlicensed**.
- Click **Add Users**.

3. Add those new, unlicensed users to the new group.
   - Click **Groups**, and then click the name of the group.
   - In the group’s page, click **Add Users**.
   - Select the users to be added, and then click **Add Users**.

For more information, see Create a Group and Add Users to It.

**Modifying user roles with Grant role on sign in**

If a user is part of a group using Grant role on sign in, then that user role can’t be set to unlicensed or downgraded to a role lower than the minimum site role set for the group, whether or not they sign in. Administrators can upgrade a user’s site role manually, however.

To downgrade a user’s site role, or unlicense the user from the site, remove the user from the group(s) that have Grant role on sign in enabled.

In accordance with the terms of the **End User License Agreement**, licenses granted on an Authorized User basis may be permanently reassigned to new users. Users may only be downgraded to a lower site role (including Unlicensed) when they will permanently discontinue access to Server Software at the higher role.
Removing users affected by Grant role on sign in

You can remove a user from a site only if the user does not own content. If you attempt to remove a user who owns content, the user site role will be set to Unlicensed and removed from all groups, but the user will not be removed from the site. To remove content owners, remove owners from group with Grant site role enabled or reassign content ownership to another user. For more information, see Remove users from a site in the View, Manage, or Remove Users help topic.

If the default All Users group has Grant site role enabled, users who own content can't be removed from the site or unlicensed. To remove or unlicense these users, reassign content ownership to another user, then remove or unlicense the user.

REST API can be used to reassign content ownership of a workbook. For more information, see Update Workbook in the REST API documentation. REST API can also be used to remove users from the site and transfer content ownership to another user. For more information, see Remove User from Site in the REST API documentation.

For more information on reassigning content ownership in Tableau Online, see Manage Content Ownership.

Buy More Licenses

You can scale your Tableau Online deployment at any time by purchasing additional licenses through the Tableau Webstore.

What accounts are eligible?

To buy more licenses through the Webstore, you must meet the following requirements:

- Customer Portal account administrator.
- Not a Government or Non-Profit account.

If you are not currently eligible, contact our sales team to complete a transaction.
Access the Tableau Webstore

Complete the following steps to redirect and buy more licenses through the Tableau Webstore:

1. Sign in to the Tableau Online site as a site administrator and go to the Users page.

2. On the Users page, click **Buy More Licenses**, and then click **Go to Webstore**. The Webstore will open in a separate browser tab.

3. Sign in to the Webstore using your Tableau account. You may not be prompted to sign in if you previously authenticated to the Customer Portal.
4. Select the number of **Creator**, **Explorer**, and **Viewer** licenses to add using the drop-down menus.

5. Click Add to Current Deployment and continue to the Contact & Billing and Summary & Payment sections of the Webstore.

You should receive order confirmation and information about your new licenses within 10 minutes. The new licenses will appear in your Tableau Online site shortly after payment.
Manage Content Access

You can manage who can access content on your site and set the permissions that govern content ownership.

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 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 interchangeably.

Why allow users to work on the site 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 site, 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 site 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 site, many Tableau administrators use projects to allow varying levels of access to content. For example, one project can be configured to 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:

- Configure Projects, Groups, and Permissions for Managed Self-Service
- 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 Creator or Explorer (can publish) site role allows both Save (overwrite) and Save As/Download.

Note that File > Save is only available to the workbook owner. When the Save permission capability has been granted at the project and workbook level, a non-owner user can overwrite the existing workbook in web authoring by selecting File > Save As and using the same workbook name. This overwrites the existing content and they become the owner and gain full access to the content.

- The Explorer site role can be granted the Web Edit and Save As/Download capabilities, but they will not be able to save (neither overwriting existing nor saving changes to a new workbook).

For more information, see Web Editing and Web Authoring.

Configure Projects, Groups, and Permissions for Managed Self-Service

Publishing to Tableau Online and Tableau Server is easy. For some organizations, it might be a little too easy. There is value in creating a controlled framework before letting creators publish their own content.

To keep things tidy and to make sure people can find and access the right content, it may be useful to configure your site for managed self-service. This means having guidelines and settings in place to ensure content is organized, discoverable, and secure without having bottlenecks in the publishing process.
This article lays out a possible path for you as a site administrator to set up your site for managed self-service:

1. Identify the types of groups and projects you’ll need
2. Create groups
3. Remove permissions that will cause ambiguities and establish default permission patterns
4. Create projects
5. Lock project permissions

**Note:** The information provided here is adapted and simplified from practices of Tableau Visionaries and customers who have shared their experiences.

**Plan your strategy**

Permissions in Tableau consist of rules that are applied to content (projects, workbooks, etc.) for a group or user. These permission rules are built by allowing or denying specific capabilities.

![Permission Template](image)

Having a comprehensive plan for your projects, groups, and permission rules is useful whether you’re starting new or making changes. The details are up to you, but there are two important practices that we recommend for all environments:

- Manage permissions on projects, not individual pieces of content.
- Assign permissions for groups, not individual users.

Setting permissions at the individual user level and on individual content assets becomes unmanageable quickly.
Use a closed permissions model

General models for setting permissions are open or closed. In an open model, users get a high level of access, and you explicitly deny capabilities. In a closed model, users get only the access they need to do their jobs. This is the model security professionals advocate. The examples in this topic follow a closed model.

For more information on how Tableau permissions are evaluated, see Effective permissions.

Identify the types of projects and groups you’ll need

Designing a structure to accommodate content (in projects) and categories of users (as groups) can be the most challenging part of setting up a site, but it makes ongoing management much easier.

Projects: Projects function both as a unit for managing permissions and as an organizational and navigational framework. Try to create a project structure that balances how people expect to find content and allows for logical permissioning.

Groups: Before you create groups it can be useful to find common themes in how people interact with content. Try to identify patterns you can use to create groups and avoid one-off permissions for individual users.

Example: Project and group structure

For example, let’s imagine an environment where there is company-wide content that everyone should be able to access, as well as some HR content that needs to be restricted.

Projects include:

- **Acme Corp Conference.** This will include data sources and workbooks for ticket sales, dashboards for content strategy, and project plans for the company conference.
- **Employee Success.** This will include anonymized data sources and workbooks for the internal employee survey.
- **Human Resources.** This will include HR data sources and workbooks that should only be available to members of the HR team.

Then, groups should match what people need to do:

- **Core Content Creators.** This group is for users who can publish to top-level projects and have broad access to data sources, but who don’t need to be able to move or otherwise manage content.
- **HR Content Creators.** This group is for users who have access to HR data sources and can publish to the HR project.
- **Business Users.** This group is for users who should be able to access the content created by the Core Content Creators, but shouldn’t even know the HR content exists.
- **HR Users.** This group is for users who should be able to access content in the HR project but don’t have rights to create or publish content.
- **Core Project Leaders.** This group is for users who should be given project leader status on the projects that aren’t HR.

Consider site roles

Remember that permissions are tied to content, not groups or users. This means that you can’t give a group Explore permissions in a vacuum. Rather, the group can be given Explore permissions for a project and its content. Site roles, however, are given to specific users and may define or limit the permissions they can have. For more information on how licenses, site roles, and permissions tie together, see Permissions, Site Roles, and Licenses.

Create the groups

While it might be tempting to create the groups and projects as soon as you identify what you need, it’s important to do things in a certain order.

**Projects:** Projects shouldn’t be created until after the Default project has been properly configured (see the next section). This is because top-level projects use the Default project as a template for their permission rules.
**Groups**: Groups need to be created before they can be used to build permission rules. Users do not need to be added to the groups yet, but they can be. For more information on creating groups, see Manage Users Using Groups.

For more information on adding users to groups, see Add Users to a Group.

**Tip**: Creating multiple groups and projects and setting permissions manually can get a little tedious. To automate these processes and make them repeatable for future updates, you can perform these tasks using REST API commands. You can use `tabcmd` commands for tasks such as adding or deleting a single project or group and adding users, but not for setting permissions.

Membership in multiple groups

It’s possible to include the users in the HR Content Creators and HR Users groups in the Business Users group. This would make it easy to assign permissions to Core Content Users versus Business Users for the majority of content. However, in that scenario, the Business Users group couldn’t be denied any capabilities in the Human Resources folder without denying the HR users as well. Instead, the Business Users group would have to be left as unspecified, and the specific HR Content Creators and HR Users groups would be given their applicable capabilities.

This is because Tableau permissions are restrictive. If the Business Users group was denied certain capabilities, that Deny would override the Allow of another permission rule for users in both groups.

```
Capability outside scope of site role?

Yes

No

Admin or project leader?

Yes

No

Content owner?

Yes

No

Denied as a user?

Yes

No

Allowed as a user?

Yes

No

Denied as a group member?

Yes

No

Allowed as a group member?

Yes

No

Denied

Allowed

Allowed

Denied

Allowed

Denied

Allowed

```
When deciding how group membership should be assigned it’s important to understand how permission rules are evaluated. For more information, see Effective Permissions.

Remove permissions that will cause ambiguities and establish default permission patterns

Every site has an All Users group and a Default project.

All Users group: Any user added to the site becomes a member of the All Users group automatically. To avoid any confusion with permission rules set on multiple groups, it’s best to remove the permissions from the All Users group.

Default project: The Default project works as a template for new projects in the site. All new top-level projects will take their permission rules from the Default project. Establishing baseline permission patterns on the Default project means you will have a predictable starting point for new projects. (Note that nested projects inherit the permission rules from their parent project, not the Default project.)

Remove the permission rule for the All Users group on the Default project

1. Select Explore to see the top-level projects on the site.
2. On the Default project’s Action (…) menu, select Permissions.
3. Next to the All Users group name, select …, and then select Delete Rule.…

This lets you establish permission rules for the groups that you have full control over without any conflicting permissions assigned to All Users. For more information on how multiple rules are evaluated to determine effective permissions, see Effective Permissions.

Create permission rules

Now you can set up the basic permission patterns for the Default project that all new top-level projects will inherit. You may choose to keep the Default project’s permission rules empty and build permissions for each new top-level project individually. However, if there are any permission rules that should apply to the majority of projects, it can be helpful to set them on the Default project.
Remember that the permissions dialog for a project contains tabs for each type of content. **You must set permissions for each type of content at the project level** or users will be denied access to that content type. (A capability is only granted to a user if they are expressly allowed it. Leaving a capability as Unspecified will result in it being denied. For more information, see Effective Permissions.)

Tip: Every time you create a permission rule at the project level, make sure you look through all the content type tabs.

Create permission rules as desired:

1. Click + Add Group/User Rule and start typing to search for a group name.
2. For each tab, choose an existing template from the drop-down or create a custom rule by clicking the capabilities.
3. When finished, click Save.

For more information on setting permissions, see Set Permissions.

Example: Project level permissions for each content type

For our example, the majority of projects should be available to most people. For the default project, we’ll use the permission rules templates to give the core content creators publishing rights and everyone else the ability to interact with workbooks and not much else.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Content Creators</td>
<td>Publish</td>
<td>Publish</td>
<td>Publish</td>
<td>View</td>
</tr>
<tr>
<td>HR Content Creators</td>
<td>View</td>
<td>Explore</td>
<td>View</td>
<td>None</td>
</tr>
</tbody>
</table>
This pattern follows a closed model and limits permissions to basic usage for most content for most users. As new top-level projects are created, these rules are what will be inherited by default, but the permission rules can be modified per project as needed. Remember that the Human Resources project should have these permissions removed and its own pattern established.

Create projects and adjust permissions

After the Default project is set with your custom permissions templates, you can create the rest of your projects. For each project, you can adjust the default permissions as appropriate.

To create a project

1. Select Explore to see the top-level projects on the site.
2. From the New dropdown, select Project.
3. Name the project and, if desired, give it a description.

It can be useful to establish a naming convention. For example, a basic structure might be <DepartmentPrefix><Team> - <ContentUse>; such as DevOps - Monitoring.

The description appears when you hover over a project thumbnail and on the Project details page. A good description can help users know they’re in the right place.

4. Adjust permissions as necessary.
   a. Open the new project.
   b. From the Action menu (...), select Permissions
c. Modify any permission rules as desired. *Remember to check all the content tabs.*

**Lock content permissions**

In addition to permission rules, projects have a content permission setting. This setting can be configured in two ways, either **Locked** (recommended) or **Customizable**.

Locking a project is a way of maintaining consistency and ensuring that all content in the project has uniform permissions (per content type). A customizable project permits authorized users set individual permission rules on pieces of content. For more information, see [Lock content permissions](#).

Regardless of the content permission setting, permissions are always enforced on content.

**Possible project structures**

Some organizations find it useful to have projects that serve specific purposes. Here are some example projects and their intended uses. Note that these are example templates and you should always test the configuration in your environment.

For information about what capabilities are included with each content type’s permission rule templates, see [Permission capabilities](#).

**Examples: permission settings for specific purposes**

**Workbooks shared for open collaboration on the server**

Anyone in the department can publish to the open-collaboration project while their content is in development. Colleagues can collaborate using web editing on the server. Some people call this a sandbox, some call it staging, and so on. On this project you can allow web editing, saving, downloading, and so on.
Here you want not only to enable collaboration, but also to enable people who don’t have Tableau Desktop to contribute and provide feedback.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Stewards</td>
<td>Publish</td>
<td>Publish</td>
<td>Publish</td>
<td>TBD</td>
</tr>
<tr>
<td>Analysts</td>
<td>Publish</td>
<td>Publish</td>
<td>Explore</td>
<td>TBD</td>
</tr>
<tr>
<td>Business Users</td>
<td>Publish</td>
<td>Publish</td>
<td>Explore</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Remember that some capabilities in the Publish template (such as Overwrite) may be prevented by a user’s site role even if they are allowed that capability.

**Note:** "TBD" indicates these permission rules aren’t easily determined by the scenario and can be set however makes sense for a given environment.

Shared reports that cannot be edited

This could be a project that people who create workbooks and data sources (Analysts and Data Stewards) could publish to when they want to make content available to business users for viewing, with confidence that their work cannot be “borrowed” or modified.

For this type of project, you would deny all capabilities that allow editing or getting the data off of the server for reuse. You would allow viewing capabilities.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Stewards</td>
<td>Publish</td>
<td>TBD</td>
<td>Publish</td>
<td>TBD</td>
</tr>
<tr>
<td>Analysts</td>
<td>Publish</td>
<td>Publish</td>
<td>View</td>
<td>TBD</td>
</tr>
<tr>
<td>Business Users</td>
<td>View</td>
<td>View</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Tableau Online Help

Vetted data sources for Analysts to connect to

This would be where Data Stewards publish the data sources that meet all of your data requirements and become the “source of truth” for your organization. Project leaders on this project can certify these data sources, so that they rank higher in search results and are included in recommended data sources.

You would allow authorized Analysts to connect their workbooks to data sources in this project, but not download or edit them. You would deny the view capability to the Business Users group for this project, so those users would not even see this project.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Stewards</td>
<td>Publish</td>
<td>TBD</td>
<td>Publish</td>
<td>TBD</td>
</tr>
<tr>
<td>Analysts</td>
<td>View</td>
<td>None</td>
<td>View</td>
<td>None</td>
</tr>
<tr>
<td>Business Users</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Inactive content

Another possibility is to segregate workbooks and data sources that the site’s administrative views show haven’t been used for a period of time. You could give content owners a time limit before their content is removed from the server.

Whether you do this or delete directly from the working projects is up to your organization. In an active environment, don’t be afraid to be intentional about removing content that is not being used.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Stewards</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Analysts</td>
<td>View</td>
<td>View</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
**Source for workbook templates**

This is a project that people can download from but not publish or save to, where authorized publishers or project leaders make template workbooks available. Templates that have your organization’s approved fonts, colors, images, and even data connections built in can save authors a lot of time and keep your reports looking consistent.

<table>
<thead>
<tr>
<th>Group</th>
<th>Projects</th>
<th>Workbooks</th>
<th>Data Sources</th>
<th>(Other content)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authorized Author</td>
<td>Publish</td>
<td>Publish</td>
<td>Publish</td>
<td>TBD</td>
</tr>
<tr>
<td>Data Stewards</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Analysts</td>
<td>View</td>
<td><em>Template: Explore</em></td>
<td>View</td>
<td>None</td>
</tr>
<tr>
<td>+</td>
<td></td>
<td><strong>Capability: Download Workbook/Save a Copy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Users</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

**Next steps**

Besides projects, groups, and permissions, other data governance themes include:

**User education**

Help all of your Tableau users become good data stewards. The most successful Tableau organizations create Tableau user groups, have regular training sessions, and so on.
For a common approach to orienting users to the site, see Dashboard-based Custom Portals. For publishing and data certification tips, see the following topics:

- Use Certification to Help Users Find Trusted Data
- Prepare for Publishing a Workbook (links to Tableau Help)
- Best Practices for Published Data Sources (links to Tableau Help)

**Optimize extract refresh and subscription activity**

If you use Tableau Server, create policies for extract refresh and subscription schedules, to avoid them dominating the site’s resources. The TC customer presentations by Wells Fargo and Sprint address this subject in detail. In addition, see the topics under Performance Tuning.

If you use Tableau Online, see the following topics to become familiar with the ways people can refresh extracts:

- Keep Data Fresh
- Use Tableau Bridge to Expand Data Freshness Options

**Monitoring**

Use administrative views to keep an eye on the site’s performance and content use.

**Administrative Views**

**Use Projects to Manage Content Access**

When Tableau Desktop users publish content to a site on Tableau Online, they can select a *project* to publish it to.

Projects can be used for navigation, organization, and access management for content like workbooks, data sources, Ask Data lenses, and nested projects.
The following image shows content within the top-level Operations project in the web authoring environment. The Operations project contains a few nested projects (highlighted) and published workbooks. A project can also contain other content types, such as data sources and flows.

![Image of Tableau Online Operations project]

**Why use projects**

Projects help you to create a scalable process for managing access to the content published to Tableau Online. Advantages they have include:

- They enable administrators to delegate content management to project leaders who work with the content more closely, without having to give them administrator access to site or server settings.
  - Project leaders can create nested projects under their top-level project, enabling them to maintain their team’s content within a single hierarchy.
- **Note:** Project owners can delete top-level projects they own. Project leaders cannot delete top-level projects.
They can make the site easier to navigate for self-service users.  
- They segment the Tableau Online site into areas that give users access based on how they use the data published to those areas, or on the Tableau user group they work with.  
- You can hide projects from groups who don’t need to use them, create a distinguishable project-naming scheme, and take advantage of project descriptions to clarify how to use the project.  
- They enable you to track permissions effectively.  
- You can create groups based on the level of content access users in the group need, and set default permissions on projects. This enables you to know exactly which capabilities new users get by default, and likewise which capabilities all users get when a new project is created.

When to create project hierarchies (example)

Many organizations have several or more distinct groups of Tableau users, each with its own priorities and leaders. These groups might share some organization-wide content (or even draw from an org-wide pool of data sources), but primarily they use data and reports that are specific to their team. In this or similar scenario, an example for using project hierarchies might look as follows:

1. You, as a site or server administrator, can create top-level projects for each of your distinct Tableau teams.
2. On each top-level project, you assign the Project Leader status to team leads, and change project ownership. Project leaders effectively are the content administrators, so it’s important that they understand how permissions work in Tableau, along with Tableau content management best practices.  
3. Each project leader can manage their project, creating the structure within the project that works for their team. That is, they can create child projects they need, based on how their team members collaborate and share data and reports.

The benefit to you as the site administrator is that you can focus on system health. The benefit to your Tableau users is that people who know the best practices for working with Tableau and data can manage these things for their teams, without having to submit IT requests to change permissions or add projects.
Project-level administration

For more information about administering projects, see Manage Permissions with Projects.

Add Projects and Move Content Into Them

A content resource (workbooks and data sources) can live in only one project. Server and site administrators can add or remove top-level projects on a site, and move published content from one project to another. Project leaders with appropriate site roles can add or remove child projects and move content between projects on which they have Project Leader access.

This article contains the steps for creating and moving projects. We recommend becoming familiar with the following related content as well:

- To learn about projects and when or why to use them, see Use Projects to Manage Content Access.
- Before you create project hierarchies, become familiar with Permissions.
- To see the specific site roles that allow full Project Leader access, see Project-level administration.

Add a top-level or child (nested) project

1. While you’re signed in to Tableau Online as an administrator or project leader, select the Content tab, and then do one of the following:

   - Select New > Project to create a new top-level project (only administrators can do this).

   - Navigate to and open the project in which you want to create a sub-project, and then select New > Project.

   If you’re not sure where to find a child project, display filters, and select Show all projects.

2. Enter a name and description for the project, and then click Create.
You can include formatting and hyperlinks in the project description. Select **Show formatting hints** for syntax.

**Note:** To edit a project description later, select it to open it, select the information icon next to its name, and then click **Edit**.

Move a content resource to another project

1. On the **Content** tab, find the content resource you want to move.
   
   If you’re not sure where to find a child project, display filters, and select **Show all projects**.

   For other content types, you can navigate through its project hierarchy, or by selecting the content type on the **Explore** menu.

2. On the workbook’s **Actions(…)** menu, select **Move**.

3. Select the new project for the workbook, and then click **Move Content**.
Moving a project includes moving everything in it, including child projects and their content.

How moving projects affect permissions

When you move a project, Project Leader permissions adapt to the new project environment.

- When the target project hierarchy is locked, previous Project Leader permissions are removed, and new Project Leader permissions are granted according to those set at the top-level of the target hierarchy.

- When the target project hierarchy is unlocked (managed by owner), previous implicitly granted Project Leader permissions are removed, explicitly set Project Leader permissions are retained, and new Project Leader permissions are granted according to those set at the top-level of the target hierarchy.
When you move project and content, permissions may be impacted. For more information, see Permissions.

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.

Important

- You cannot undo deleting a project.
- Deleting a project deletes all content in it, including child projects and their content.
- You cannot delete the Default project.

To delete a project:

1. On the Content tab, find the project you want to remove.

   If you’re not sure where to find a child project, display filters, and select Show all projects.

2. On the project’s Actions (…) menu, select Delete.

3. Confirm that you want to delete the project.

Required access level for moving content

Moving content is effectively like removing it from one project and publishing it to another. For non-administrators, the permissions needed on the source project are different than those needed on the destination project.

Required site role

To move content, users must have one of the following site roles:
• Server Administrator (Tableau Server only)
• Site Administrator Creator or Site Administrator Explorer
• Creator or Explorer (Can Publish)

Users with a Server Administrator or Site Administrator site role do not need any additional capabilities.

Required permissions for the project that users move content to

Non-administrators must have the **Publish** permission capability for the project that is the move destination.

Required permissions for the project that users move content from

Non-administrator users must

• Be the project owner, project leader, or content owner

  OR

• Have the **Move** permission capability for the content (or, for data sources, be the data source owner).

For more information, see Move content.

**Add a Project Image**

To help distinguish projects you manage on Tableau Online (and help your users find them), you can add an image that appears in the thumbnail. Your image must meet the following requirements:

• The image must be accessible using HTTPS protocol. Shared network directory and related protocols (UNC, SMB, AFP, NFS, etc) are not supported. HTTP protocol for project images is not supported by Google Chrome.
• All users who access the project must have, at a minimum, "read-only" permission on the target image.
• The image must be common internet format: .jpg, png, or gif.
Set a project image

1. Sign in to a site on Tableau Online. In the list of Top-level Projects you have access to, select or navigate to the project you want to update. In this example, we'll add an image to the Statistics project folder.

   If you're not sure where to find a child project, use the Explore drop-down list and select All Projects.

2. Click the Details icon (i), to open the Project details dialog box, and then click Edit.
3. In the **About** field, you can enter a description for your project (optional), for example "Global and US statistics." At the end of the project description, add the URL for your image using the following syntax:

!http://www.example.com/image.png!
Select **Show formatting hints** to see how you can format description text.

**Note:** Images embedded in project descriptions cannot be resized or positioned. Recommended size is (300 x 184 pixels). Images that are not 300 x 184 pixels may be stretched, shrunk, or cropped to fit the width of the thumbnail. In addition, they must be added at the end of the project description and be enclosed in ! (exclamation marks), otherwise they will not be displayed as the thumbnail.

4. Click **Save**.
Let Site Users Request Access to Content

Permissions determine if a user has viewing access to workbook, view, or content inside a project. If an existing site user clicks on content or a project they don’t have access to, they can select Request Access to send a request to the owner controlling permissions for that piece of content.

When someone requests access, the owner who controls permissions for that content (either at the project or workbook level) receives an email with the name and email of the requester, the content or project requested, and a link to the project or content controlling permissions on the requested item.
Tableau Online Help

For example, if a user requests access to a workbook and content permissions are locked to the project, then the project owner receives the request. Likewise, if a user requests access to a workbook and project permissions are managed by the workbook owner, then the workbook owner receives the request.

Once permission is granted, the owner can email the requester to let them know they have view capability to the project or workbook.

Default settings

The Request Access setting is enabled by default on a new site. To enable the setting if it’s been disabled:

1. Go to the General tab of the Settings page for your site.
2. On the General tab, scroll down to Request Access and select Let users request access to projects, workbooks, and views.
3. Click Save.

Configure project permissions

You can control who will receive the access request by adjusting the project’s content permissions. If content permissions are:

- Locked to the project: the project owner receives the request.
- Managed by the owner: The workbook owner receives the request.

To manage content access using projects, see Use Projects to Manage Content Access and Permissions.

For more information about how permission rules are evaluated, see Permissions: Evaluate permission rules.

Change project permissions

For administrators and project leaders

Permissions can be set at the project level for both the project itself and for any content in the project. For example, if workbook permissions are configured at the project level, all
workbooks published into that project inherit those default permissions. However, the Creator can choose to change the permissions during publishing, or certain users can change the permissions on published content. To enforce the permissions established at the project level, **Content Permissions** can be locked to the project. For more information, see Lock content permissions.

To set permissions at the project level:

1. Navigate to the project
2. Open the Actions menu (…) and click **Permissions**. The permissions dialog box opens.

This dialog box has two main areas: permission rules at the top and the effective permissions grid below. Use the tabs to navigate between types of content.
Tableau Online Help

With a row selected at the top, the effective permissions grid populates. Use this to verify permissions. Hovering over a capability indicator provides information about why the capability is allowed or denied for that specific user.

3. To modify an existing permission rule, select the rule and click the capability boxes to toggle through allowed/denied/unspecified.

4. To create a new rule,
   a. Select + Add Group/User Rule.
   b. Select a group or user from the drop-down box. This creates a row where you can configure the permission rule.

5. In the row for the permission rule
   a. choose an existing permission role template from the drop-down box for each content type tab.

   b. Or create a custom rule by navigating to a content type tab and clicking the capabilities. One click sets the capability to Allowed, two clicks sets it to Denied, and a third click clears the selection (Unspecified).

6. When finished, click Save.

Change content permissions

*For administrators, project leaders, and content owners*

If project permissions are not locked, permissions for individual pieces of content can be modified.
**Warning:** Tableau recommends managing permissions at the project level within the Tableau site. These steps are relevant only for content in projects where permissions are managed by the owner.

Set permissions on content

1. Navigate to the content (workbook, data source, flow, data role)
2. Open the Actions menu (…) and click **Permissions**. The permissions dialog box opens.

This dialog box has two main areas: permission rules at the top and the effective permissions grid below.

![Permissions Dialog Box](image)

With a row selected at the top, the effective permissions grid populates. Use this to verify permissions. Hovering over a capability square provides information about why the capability is allowed or denied for that specific user.

3. To modify an existing permission rule, open the Actions menu (…) for that row and click **Edit**.
4. To create a new rule,
   a. Select + Add a user or group rule.
   b. If necessary, use the drop-down box on the right to change between groups and users.
   c. Select a group or user from the drop-down box. This creates a row where you can configure the permission rule.
5. In the row for the permission rule, choose an existing permissions role template from the drop-down box or create a custom rule by clicking the capabilities.

   One click sets the capability to **Allowed**, two clicks sets it to **Denied**, and a third click clears the selection (**Unspecified**).

6. When finished, click **Save**.

Set permissions on a view

In some situations, it may be valuable to specify permissions on a view independently from the workbook that contains it. To set permissions on a published view, navigate to the view within a published workbook and follow steps above.

**Warning**: While it is possible to set view-level permissions within a workbook, we strongly recommend managing permissions at the project (or workbook) level as much as possible. For views to inherit permissions, the project must be locked or the workbook must be published with **Show Sheets as Tabs**. See Let Site Users Request Access to Content for more information.

**Permissions**

Permissions determine how users can interact with content such as workbooks and data sources. Permissions are set in the permission dialog or via the **REST API**. At the top of the dialog, permission rules configure capabilities for groups or users. Below, the permissions grid displays the effective permissions for users.
There are several interrelated topics that discuss how to think about, set, and manage permissions. The main topics are:

- This topic, which covers the fundamentals, how to set permission rules for projects and other content, and permission considerations for specific scenarios.
- Permission Capabilities and Templates, which covers in detail the various capabilities that are used to build permission rules.
- Manage Permissions with Projects, which covers using projects to manage permissions and how nested and locked projects impact permissions.
- Effective permissions, which covers how permission rules are evaluated and how final permissions are determined.
- Permissions, Site Roles, and Licenses, which covers how permissions interact with site roles and licenses to determine what a user can do on a site.

Additionally, if Data Management is licensed, permissions for external assets have additional considerations. For more information, see Manage Permissions for External Assets.
Permissions fundamentals

Projects and groups

Tableau sites use projects to organize content and groups to organize users. Managing permissions is easier when permission rules are:

- Set at the project level instead of on individual pieces of content.
- Established for groups instead of individuals.

Permissions can only be established for users, groups, projects, or content that already exist. For more information about creating users and groups, creating projects, and publishing content, see Manage Users and Groups, Use Projects to Manage Content Access, and Publish Data Sources and Workbooks.

Capabilities and permission rules

Permissions are made up of capabilities—the ability to perform actions like view content, web edit, download data sources, or delete content. Permission rules establish what capabilities are allowed or denied for a user or group on a piece of content.

For more information about capabilities and permission rule templates, see Permission Capabilities and Templates.

Note: When talking about permissions in general, it’s common to see a phrase like “a user must have the delete permission.” This is easy to understand in a broad context. However, when working with permissions at a technical level like in this article, it’s more accurate to say “the delete capability.” In this topic we’ll use the more precise term capability, but you should be aware that you might see permission in other places.
For a breakdown of the capability icons and their meanings, see Permission Capabilities and Templates.

The interplay between license level, site role, and potentially multiple permission rules factor into the final determination of what a user can or can’t do. For each user this becomes their *effective permissions*. For more information, see Effective permissions.

Some tasks such as creating new workbooks from a browser (web authoring) or moving content might require specific configurations of several capabilities rather than being captured in a single capability. For more information, see Permission settings for specific scenarios.

Set permissions

Permission rules are set differently at the project level, at the content level, or when publishing content from Tableau Desktop.

**Note:** The phrase “project permissions” can have two meanings. There are the permission capabilities for a project itself—View and Publish—that control how a user can interact with a project. There is also the concept of project-level permission rules for other content types. In this article “project-level permissions” means permission rules for workbooks, data sources, and the other content that are configured in the permission dialog for a project. This is in contrast to “content-level” permission rules that can be set on a specific workbook, data source, etc.

Project-level permissions
For administrators, project owners, and project leaders

To set permissions at the project level:

1. Navigate to the project
2. Open the Actions menu (...) and click Permissions.

The permissions dialog opens. This dialog has two main areas: permission rules at the top and the effective permissions grid below. Each content type has a tab. The image below shows the Workbook tab.
With a row selected at the top, the effective permissions grid populates. Use this to verify permissions. Hovering provides information about why the capability is allowed or denied for that specific user.

3. To modify an existing permission rule, select the appropriate tab for that content type and click a capability.

4. To create a new rule, click + Add Group/User Rule and start typing to search for a group or user. For each tab, choose an existing template from the drop-down box or create a custom rule by clicking the capabilities.

One click sets the capability to **Allowed**, two clicks sets it to **Denied**, and a third click clears the selection (**Unspecified**).

5. When finished, click **Save**.
Set project permissions for all content types

Remember that the permissions dialog for a project contains tabs for each type of content. **You must set permissions for each type of content at the project level or users will be denied access to that content type.** A capability is only granted to a user if they are expressly allowed it. Leaving a capability as Unspecified will result in it being denied.

**Tip:** Every time you create a permission rule at the project level, make sure you look through all the content type tabs.

Configure the content permissions setting

Permission rules set at the project level act as a default for content saved in that project and any nested projects it contains. Whether those project-level default rules are kept uniform or are able to be edited depends on the **content permission** setting. This setting can be configured in two ways, either **Locked** or **Customizable**. For more information, see Lock content permissions.

**Content-level permissions**

*For administrators, project leaders, and content owners*

If project content permissions are customizable, permissions for individual pieces of content can be modified. The information below is not relevant to content in locked projects. For more information, see Lock content permissions.

**Tip:** While it is possible to set permissions on individual content in customizable projects, we recommend managing permissions at the project level.
Set permissions on content

1. Navigate to the content (workbook, data source, flow, data role)
2. Open the Actions menu (…) and click Permissions.

The permissions dialog opens. This dialog has two main areas: permission rules at the top and the effective permissions grid below. (Note the lack of tabs across the top—a content-level permissions dialog has no tabs.)
With a row selected at the top, the effective permissions grid populates. Use this to verify permissions. Hovering over a capability square provides information about why the capability is allowed or denied for that specific user.

3. To modify an existing permission rule, click a capability.

4. To create a new rule, click **Add Group/User Rule** and start typing to search for a group or user. Choose an existing template from the drop-down or create a custom rule by clicking the capabilities.

   One click sets the capability to **Allowed**, two clicks sets it to **Denied**, and a third click clears the selection (**Unspecified**).

5. When finished, click **Save**.

Set permissions on a view

**Tip:** While it’s possible to set view-level permissions within a workbook, we strongly recommend managing permissions at the project (or, if necessary, workbook) level.
If a workbook is published with **Show Sheets as Tabs** checked, the views in that workbook will inherit all permissions set for the workbook. The permission dialog for a view will be read-only.

In some situations, it may be valuable to specify permissions on a view independently from the workbook that contains it. If the workbook is published with **Show Sheets as Tabs** unchecked (sheet tabs hidden), the views will start with the workbook permissions but will be independent thereafter and can be set independently. Note that this means if the permission rules are modified for the workbook, those changes won’t be applied to the views—each view’s permissions will need to be managed individually.

See Show or Hide Sheet Tabs for more information.

**Set permissions at publish**

*For content publishers*

If project content permissions are customizable, permissions for individual content can be set when publishing from Tableau Desktop. The information below is not relevant for content in locked projects. For more information, see Lock content permissions.

**Tip:** While it’s possible to set permissions on individual content in customizable projects, we recommend managing permissions at the project level.

1. From the publishing dialog, click the Edit link for **Permissions**.
   If the Edit link is unavailable, permissions are locked to the project and can’t be modified except by the project owner, project leader, or an administrator.

2. The Add/Edit Permissions dialog shows any existing permission rules. Click **Add** to add a new permission rule or **Edit** to modify an existing permission rule
   a. Select the group or user from the left pane. You can expand a group to see which users it contains.
   b. Use the selector at the top of the right pane to choose an existing template, or use the radio buttons to create a custom rule.
Note that effective permissions can’t be inspected from the publishing dialog.

3. When finished, click **OK** and resume publishing.

**Note:** Permissions can’t be set while publishing flows from Tableau Prep Builder. To set permissions on a flow, refer to the steps for Project-level permissions or Content-level permissions.

Clean up the All Users group

By default, all users are added to an “All Users” group that has basic permissions for content. To start with a clean slate when building your own permission rules, we recommend that you delete the rule entirely or edit the rule for All Users to remove any permissions (set the permission role template to None). This will help prevent any ambiguity down the road by reducing the number of rules that applies to any given user and therefore making effective permissions easier to understand.
Permission settings for specific scenarios

Certain actions require combinations of permission capabilities and possibly site roles. The following are some common scenarios and their necessary permission configurations.

Saving, publishing, and overwriting

In the context of permissions, saving is essentially publishing. As such, the **Overwrite** and **Save a Copy** capabilities can only be given to users with a site role that allows publishing: Administrator, Creator, or Explorer (can publish). Explorer or Viewer site roles can't publish, overwrite, or save a copy.

(Prior to version 2020.1, the **Publish** and **Overwrite** capabilities were called **Save**, and the **Download Workbook/Save a Copy** capability was called **Download Workbook/Save As**.)

- The **Publish** capability for a project allows a user to publish content into that project.
- The **Overwrite** capability allows a user to save over an existing piece of content. By saving over the content, the user becomes the owner of that content. The Overwrite capability also allows users to edit minor aspects of existing pieces of content, such as the description for a metric or the synonyms for a data role. Editing the existing content in this way doesn't change the owner of the content.
- The **Save a Copy** capability allows a user to save a new copy of the content. This is usually done in conjunction with web authoring and means the user can save their modifications.

It’s important to note that users aren’t able to Save or Save As a piece of content unless they have the **Publish** capability for at least one project, because all content must be published into a project. Without the **Publish** capability at the project level, the content can’t be published.

In web editing, the **Save** option in the File menu only appears to the content owner. If a user who is not the owner has the **Overwrite** capability (allowing them to save the content), they must use **File > Save As** and name the workbook the exact same name. This prompts a warning that they are about to overwrite the existing content, which they can do. Conversely, a user with only the **Save a Copy** capability trying to use the same name gets an error stating they don’t have permission to overwrite the existing content.
If a user who is not the content owner overwrites content, they become the owner, with all the permissions that entails. The original owner’s access to the content is then determined by their permissions as a user rather than the owner.

**Note:** Download Workbook/Save a Copy is a joint capability for workbooks. Explorers can be given this capability but they are only able to download the workbook, not save a copy. Giving the capability to Explorer (can publish), Creator, or Administrator site roles gives them both the ability to download workbooks and save a copy.

Web Editing and Web Authoring

Web editing and web authoring allows users to edit or create workbooks directly in the browser. Starting in version 2020.4, Tableau Prep Builder supports web authoring for flows.

The permission capability is called *Web Edit* and the site setting is called *Web Authoring*. This section will refer to any web-based editing or publishing action as *web authoring*.

To enable this functionality, there are several requirements.

- **User site role:** The user must have the appropriate site role.
  - Viewers can never web edit.
  - Explorers can be given the web edit capability but can’t publish. Essentially, they can use web editing to answer deeper questions based on existing content on the fly, but can’t save their edits.
  - Explorers (can publish) or Site Administrator Explorers can publish, but they can only use data that is already published to the site.
  - Creators, Site Administrator Creators, and Server Administrators can publish and create new data sources.

- **Permission capabilities:** The user must have the necessary permission capabilities based on the desired functionality.

### Required Permission Capability Settings

<table>
<thead>
<tr>
<th>Desired functionality</th>
<th>Minimum Site Role</th>
<th>Web Edit</th>
<th>Download/Save</th>
<th>Overwrite (work-</th>
<th>Publish (pro-</th>
<th>Connect</th>
</tr>
</thead>
</table>

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### Data access for published Tableau data sources

Data sources published to a Tableau site can have native authentication as well as permissions within the Tableau environment.

When the data source is published to the Tableau site, the publisher can choose how to Set Credentials for Accessing Your Published Data which addresses how data source credentials are handled (such as requiring users to log into a database or enter their credentials for Google Sheets). This authentication is controlled by whatever technology holds the data. This can be embedded when the data source is published, or the data source publisher can choose to prompt the user for their credentials to the data source. For more information, see Publish a Data Source.

<table>
<thead>
<tr>
<th>Role</th>
<th>Data Source Creation</th>
<th>Permissions</th>
<th>Access</th>
<th>Allow</th>
<th>Deny</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web author without being able to save</td>
<td>Explorer</td>
<td>Allow</td>
<td>Deny</td>
<td>Optional</td>
<td>Allow</td>
<td></td>
</tr>
<tr>
<td>Web author and save as new content</td>
<td>Explorer (can publish)</td>
<td>Allow</td>
<td>Allow</td>
<td>Optional</td>
<td>Allow</td>
<td></td>
</tr>
<tr>
<td>Web author and save (overwrite) content</td>
<td>Explorer (can publish)</td>
<td>Allow</td>
<td>Allow</td>
<td>Optional</td>
<td>Allow</td>
<td></td>
</tr>
<tr>
<td>Web author with new data and save new content</td>
<td>Creator</td>
<td>Allow</td>
<td>Optional</td>
<td>Optional</td>
<td>Allow</td>
<td></td>
</tr>
</tbody>
</table>

Optional indicates this capability is not involved in the desired functionality.
There are also data source capabilities that allow or deny users the ability to see **View** and connect to the published data source (**Connect**) in the context of Tableau. These capabilities are set like any other permissions in Tableau.

When a workbook is published that uses a published data source, the author can control how the Tableau authentication will behave for someone consuming the workbook. The author sets the workbook’s access to the published data source, either as **Embed password** (using the author’s Connect access to the data source) or **Prompt users** (using the Connect access of the person viewing the workbook), which may require data source authentication as well.

- When the workbook is set to **Embed password**, anyone who looks at the workbook will see the data based on the author’s access to the data source.
- If the workbook is set to **Prompt users**, the Tableau-controlled access is checked for the data source. The person consuming the workbook must have the Connect capability for the published data source to see the data. If the published data source is also set to Prompt user, the viewer must also enter their credentials for the data source itself.

<table>
<thead>
<tr>
<th>Workbook authentication to the data source</th>
<th>Data source authentication to the data</th>
<th>How data access is evaluated for someone consuming the workbook</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embed password</strong></td>
<td><strong>Embed password</strong></td>
<td>User sees the data as if they were the workbook author</td>
</tr>
<tr>
<td><strong>Embed password</strong></td>
<td><strong>Prompt user</strong></td>
<td>User sees the data as if they were the workbook author. (The author is prompted for data source authentication, not the user.)</td>
</tr>
<tr>
<td><strong>Prompt user</strong></td>
<td><strong>Embed password</strong></td>
<td>User must have their own <strong>Connect</strong> capability to the published data source</td>
</tr>
<tr>
<td><strong>Prompt user</strong></td>
<td><strong>Prompt user</strong></td>
<td>User must have their own <strong>Connect</strong> capability to the published data source and are prompted for their credentials to the underlying data</td>
</tr>
</tbody>
</table>
Note that this applies to consuming a workbook, not web editing. To web edit, the user must have their own Connect capability.

Move content

To move an item, open its Action menu (...) and click Move. Select the new project for the item, then click Move Content. If Move is unavailable or there are no available destination projects, verify the appropriate conditions are met:

- Administrators can always move content and projects to any location.
- Project leaders and project owners can move content and nested projects among their projects.
  - Note that non-administrators can’t move projects to become top-level projects
- Other users can move content only if all three of the following requirements are met:
  - Creator or Explorer (Can Publish) site role.
  - Publishing rights (View and Publish capabilities) for the destination project
  - Owner of the content, or—for workbooks and flows—having the Move capability.

For information about how permissions are handled when moving content and projects, see Move projects and content.

Metrics

Metrics are created from views in published workbooks. Users can create metrics if they:

- Are a Creator or Explorer (can publish) site role
- Have the Publish capability on a project
- Have the Create/Refresh Metric capability for the relevant workbook

For more information, see Create and Troubleshoot Metrics and Set Up for Metrics.

**Note:** Prior to 2021.3, the ability to create a metric on a view was controlled by the Download Full Data capability.

Because metrics are independent content, it’s important to note that the permissions for metrics are managed independently from the view they were created from. (This is unlike data-
driven alerts and subscriptions, where the content of the alert or subscription can only be seen if the user has the correct permissions for the view itself.)

Although the capabilities for metrics are straightforward, the View capability should be considered carefully. It may be possible for a workbook with restricted permissions to be the basis for a metric with more open permissions. To protect sensitive data, you might want to deny metric creation for specific workbooks.

Metrics display data from their owner’s perspective

When you create a metric, you capture your perspective of the data from that view. This means that any users who can access your metric will see the data as it appears to you. If the data in the view is filtered based on your credentials, the data you see might be different from what other users see when they access the same view. Limit the View capability for your metric if you’re concerned about exposing your perspective of the data.

Show or Hide Sheet Tabs

In the context of published content, sheet tabs (also referred to as tabbed views) is a distinct concept from sheet tabs in Tableau Desktop. Showing and hiding sheet tabs in Tableau Desktop refers to hiding sheets in the authoring environment. For more information, see Manage Sheets in Dashboards and Stories.

Showing and hiding sheet tabs (turning tabbed views on or off) for published content refers to navigation in a published workbook. When sheet tabs are shown, published content has navigational sheet tabs along the top of each view.
This setting is also impacts how permissions function and may have security implications (see note).

**Note:** It is possible to have the **View** capability for a view without the **View** capability for the workbook or project that contain it. Normally if a user lacks the View capability for a project and workbook, they would not know those assets exist. If they have the View capability for a view, however, a user may be able to see the project and workbook name when looking at the view, such as in the navigational breadcrumb. This is expected and accepted behavior.

Turn off tabbed views to allow independent view permissions

Although it is not recommended as a general practice, there are times when it can be useful to set permissions on views independently of the workbook that contains them. To do so, three conditions must be met:

1. The workbook must be published—there is no way to set view permissions during publishing.
2. The workbook must be in a customizable project.
3. The workbook can’t show sheets as tabs (tabbed views must be hidden).

When a workbook shows sheets as tabs, all views inherit the workbook permissions and any changes to the workbook permissions affect all of its views. **When a workbook in a customizable project does not show tabbed views, all views assume the workbook permissions upon publication, but any subsequent changes to the workbook’s permission rules will not be inherited by the views.**

Changing the configuration of sheets as tabs on a published workbook will also impact the permission model. Show Tabs will override any existing view-level permissions and reinstate the workbook-level permissions for all views. Hide Tabs will break the relationship between the workbook and its views.

- To configure sheets as tabs on a published workbook, open the Actions menu (…) for the workbook and select **Tabbed Views**. Choose **Show Tabs** or **Hide Tabs** as desired.
- To configure sheets as tabs during publishing, refer to **Show sheets as tabs**.
- To set view-level permissions, see Set permissions on content.

**Important:** In a customizable project, any modifications to the workbook-level permissions will not be applied if navigational sheet tabs are hidden (aka tabbed views are off). Changes to permissions must be made on individual views.

Collections

Unlike projects, which contain content, a collection can be thought of as a list of links to content. Project permissions can be inherited by the content in the project, but permissions for a collection have no affect on the content added to the collection. This means that different users might see different numbers of items in a collection, depending on which items they have permission to view. To make sure that users can see all items in a collection, adjust the permissions for those items individually.

Permissions for a collection can be changed either by using the permissions dialog or by granting access upon sharing a collection, if you’re an administrator or the collection owner. For more information, see **Manage Collection Permissions**.
Private collections

When a collection is created, it is private by default. A private collection appears on the owner’s My Collections page, but it doesn't appear in the list of all collections on a site. Private collections are simply collections with no permission rules added. Unlike other types of content, collections don't have the “All Users” group added by default. When you add permission rules to a collection, it is no longer flagged as private. To return a collection to a private state, remove the permission rules.

Private collections can be viewed by the collection owner as well as by administrators, whose site role gives them effective permissions to view all collections.

Explain Data

When Explain Data is available, a user can select a mark in a view and click Run Explain Data in the mark’s Tooltip menu. A combination of settings must be enabled to make Explain Data available in editing mode and viewing mode.

Requirements for authors to run Explain Data or edit Explain Data settings in editing mode:

- Site setting: **Availability of Explain Data** set to **Enable**. Enabled by default.
- Site role: Creator, Explorer (can publish)
- Permissions: **Run Explain Data** capability set to **Allowed**. Unspecified by default. If you open a workbook (Tableau version 2022.1 or earlier) that used this permission in Tableau version 2022.2 or later, you will need to reset the Run Explain Data capability to Allowed.

**Note:** The **Download Full Data** capability for a Creator or Explorer (can publish) controls whether they see the View Full Data option in Extreme Values explanations. Viewers are always denied the Download Full Data capability. However, all users can see record-level details when the Extreme Values explanation type is enabled in Explain Data settings.

Requirements for all users to run Explain Data in viewing mode:
Site setting: **Availability of Explain Data** set to **Enable**. Enabled by default.

Site role: Creator, Explorer, or Viewer

Permissions: **Run Explain Data** capability set to **Allowed**. Unspecified by default. If you open a workbook (Tableau version 2022.1 or earlier) that used this permission in Tableau version 2022.2 or later, you will need to reset the Run Explain Data capability to **Allowed**.

**Ask Data Lenses**

By default, users with a site role of Explorer (can publish) and Creator have the **Overwrite capability** for lenses. This means that any user with the appropriate role can edit the name, description, fields, synonyms, and suggested questions for a lens.

To limit who can edit a lens, deny the **Overwrite capability** for specific users or entire groups. To limit all lenses in a project, deny the **Overwrite capability** for lenses at the project level.

**Permission Capabilities and Templates**

Permissions are made up of capabilities, or the ability to perform a given action on a piece of content, such as view, filter, download, or delete. Each row in the Permission Rules area of the dialog is a **permission rule**. Permission rules are the setting for each capability (allowed, denied, or unspecified) for the group or user in that row. Permission rules have **templates** available that make it easier to assign capabilities quickly. Permission rules can also be copied and pasted.

**Note:** In the permission dialog for projects, there are tabs for each content type (Projects, Workbooks, Data Sources, Ask Data Lenses, Data Roles, Flows, Metrics and—if you have the Data Management—Virtual Connections). When a permission rule is added, the default for all capabilities across all content types is Unspecified. To allow or deny capabilities for each content type, you must go to each tab in turn. In the permission dialog for a specific piece of content, there are no tabs and the permission rules only apply to that piece of content.
Templates

Templates group sets of capabilities that are often assigned together based on common user scenarios, View, Explore, Publish, and Administer. When you assign a template, its included capabilities are set to Allowed, with the rest left as Unspecified. The templates are cumulative, so the Explore template includes everything from the View template plus additional capabilities. All content also has a template for None (which sets all capabilities to unspecified) and Denied (which sets all capabilities to denied).

Templates are meant to be a starting point and can be adjusted after they are applied. Capabilities can also be granted or denied without using a template at all. In both cases, the template column then shows Custom.

Copy and paste permissions

If there is a permission rule that needs to be assigned to multiple groups or users, you can copy and paste from one rule to another. You can’t copy from or paste onto a rule that involves Project Leader status.

1. Open the action menu (...) for the existing rule you want to copy from and select Copy Permissions. This is available only when the rule is not in edit mode.
2. Select an existing rule you want to paste over. You can also create a new rule by clicking + Add Group/User Rule and selecting a group or user.
3. Open the action menu (...) and select Paste Permissions.

Capabilities

Each content type has specific capabilities:

Projects

Projects have only two capabilities and two templates. Prior to Tableau 2020.1, Project Leader was treated as a permission capability rather than a setting. For more information about project leaders and how to assign them in Tableau 2020.1 and later, see Project administration.
View template

View lets a user see the project. If a user hasn’t been granted the view capability, the project won’t be visible to them. Granting the view capability for a project does not mean a user can see any content in the project, just the existence of the project itself.

Publish template

Publish lets a user publish content to the project from Tableau Desktop or Tableau Prep Builder. The publish capability is also required to move content into the project or save content to the project from web authoring.

Workbooks

View template

View lets a user see the workbook or view. If a user hasn’t been granted the view capability, the workbook won’t be visible to them.

Filter lets a user interact with filters in the view, including keep only and exclude filters. Users lacking this capability won’t see filter controls in the view.

View Comments lets a user view the comments associated with the views in a workbook.

Add Comments lets a user add comments to views in a workbook.

Download Image/PDF lets a user download each view as a PNG, PDF, or PowerPoint.

Download Summary Data lets a user view the aggregated data in a view, or in the marks they’ve selected, and download that data (as a CSV).

Run Explain Data lets a user run Explain Data on marks in editing and viewing mode.
Note that for Explain Data to be displayed as an option when a user selects a mark in a workbook, the feature must also be enabled as a site setting. To make Explain Data available in viewing mode, the feature must also be allowed by the author from within a workbook in Explain Data settings. For more information, see Control Access to Explain Data.

**Explore template**

- **Share Customized** lets users add their custom views to the list of “Other Views” visible on a workbook.
  - When this capability is denied, users won’t see the “Make visible to others” option when they create a custom view. For more information, see Use Custom Views. This capability doesn’t impact the ability to share a custom view with the share dialog or by copying the link.

- **Download Full Data** lets a user view the underlying data in a view, or in the marks they’ve selected, and download that data (as a CSV).

- **Web Edit** lets a user edit the view in a browser-based authoring environment.
  - Note that creating new content in the browser or saving views from the web edit interface requires a specific combination of capabilities. For more information, see Web Editing and Web Authoring.
  - The Web Editing feature must also be enabled for the entire site or even users with this capability allowed won’t be able to web edit. For more information, see Set a Site’s Web Authoring Access.

**Publish template**

- **Download Workbook/Save a Copy** lets a user download a packaged workbook (as a TWBX). Lets a user save (publish) a copy from the web edit interface as a new workbook.

- **Overwrite** lets a user overwrite (save) the content asset on the server.
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- When allowed, the user can re-publish a workbook, data source, or flow, or save a workbook or flow in web authoring, thereby becoming the owner and gaining access to all permissions. Subsequently, the original owner’s access to the workbook is determined by their permissions just like any other user.

Create/Refresh Metrics lets a user create metrics on the views in a workbook and lets any metrics that a user creates from those views refresh. For more information, see Create and Troubleshoot Metrics.

Administer template

Move lets a user move workbooks between projects. For more information, see Move content.

Delete lets a user delete the workbook.

Set Permissions lets a user create permission rules for the workbook.

Views

In a workbook that is not in a locked project and does not show sheets as tabs for navigation, views (sheets, dashboards, stories) inherit the workbook permissions at publication, but any changes to permission rules must be made on individual views. View capabilities are the same as those for workbooks, except for Overwrite, Download Workbook/Save a Copy, and Move which are only available at the workbook level.

We recommend showing navigational sheet tabs whenever possible so views continue to inherit their permissions from the workbook.

Data Sources

View template

View lets a user see the data source on the server.
Connect lets a user connect to a data source in Tableau Desktop, Tableau Prep Builder, Ask Data, or web editing.

- If a workbook author embeds their credentials to a published data source in a published workbook, they are essentially embedding their Connect capability. Therefore, users can see the data in the workbook regardless of their own Connect capability for that data source. If the workbook author doesn’t embed their credentials to the published data source, the user needs their own Connect capability to the data source to consume the workbook. For more information, see Data access for published Tableau data sources.
- A user must have the Connect capability for a data source to use Ask Data and to create Ask Data lenses. For more information, see Enable Ask Data for Sites and Data Sources.

Explore template

- Download Data Source lets a user download the data source from the server (as a TDSX).

Publish template

- Overwrite lets a user publish a data source to the server and overwrite the data source on the server.

Administer template

- Delete lets a user delete the data source.
- Set Permissions lets a user create and edit permission rules for the data source.

Other content types

<table>
<thead>
<tr>
<th>View template</th>
<th>Explore template</th>
<th>Publish template</th>
<th>Administer template</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>View lets a user</td>
<td>Overwrite lets a user</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
<td>----------------------</td>
<td></td>
</tr>
<tr>
<td>Flows</td>
<td>view the flow.</td>
<td>publish a flow and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>overwrite the</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>published flow.</td>
<td></td>
</tr>
<tr>
<td>Data Roles</td>
<td>view data roles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metrics</td>
<td>view metrics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask Data</td>
<td>view the lens.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lenses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual</td>
<td>view the virtual connection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Connect*

lets a user connect to data using a virtual connection.

Collections

| Collections | View | n/a | n/a | n/a |

*For Virtual connections, note that by default, virtual connections have a Custom template that sets the View capability to Allowed but not the Connect capability. Be sure to set the Connect capability to Allowed so users can connect using the virtual connection.

Manage Permissions with Projects

Using projects can simplify permission management through features such as nested project hierarchies, hiding projects from certain users or groups, authorizing project leaders, and locking permissions.

**Tip:** How permissions are set at the project level is very important, especially for the Default project. When a new top-level project is created it inherits its default permission rules (for all content types) from the Default project. When a new project is created nested inside another project, the child project inherits its default permission rules from the parent project.

Project administration

Projects are containers used to organize and manage access to content. By giving non-administrators privileges to manage projects, certain content administration tasks can be handled at the project level.

**Project Leaders:** Projects can have project leaders, users who have been set as a project leader. This setting automatically grants a user their maximum capabilities—depending on their site role—for that project and all content in that project. Project leaders
with site role of Explorer (can publish) and above will therefore have all capabilities. Project leaders are essentially local admins for the project without access to site or server settings.

**Hierarchy:** Only administrators can create top-level projects. Project owners and project leaders can create nested projects inside their projects. Project owners and leaders have full administrative access to the project and its content, as well as any nested projects it contains. In a hierarchy, project leaders are implicitly given project leader access to all child content. To remove project leader access, you must do so at the level in the hierarchy where the role was explicitly assigned.

**Ownership:** A project can have multiple project leaders, but each project has exactly one owner. By default, a project is owned by the user who created it. A project’s owner can be changed (by the existing owner or an administrator, but not a project leader) to any user with a site role of Explorer (can publish) or Creator, or an administrator site role. Project ownership can be changed regardless of whether the project permissions are locked. Note that this refers to project ownership. Content ownership can be changed by project owners, project leaders, and administrators.

**Deleting:** Content can only exist inside a project. Only administrators can create and delete top-level projects, but project leaders can create or delete nested projects. Deleting projects also deletes all the content and nested projects they contain. To delete a project without losing its content, move the content to another project first. Deleting projects can't be undone.

For a deeper dive into project administration, see Use Projects to Manage Content Access and Add Projects and Move Content Into Them.

Set a project leader

Project leaders are users who have administrator-like access for a specific project or project hierarchy. Prior to 2020.1, **Project Leader** was a capability that could be set to allowed, denied, or unspecified like any other capability. Starting in 2020.1, project leaders are now assigned through the action menu and function as a setting rather than a capability.

To assign project leader status to a group or user
1. Open the permission dialog for the appropriate project.
2. Select an existing permission rule, or click + Add Group/User Rule and choose the desired group or user.
3. Open the action menu (…) for that permission rule and select Set Project Leader.

**Note:** If the action menu includes an option for Enable “Set Project Leader”, this will need to be selected before the group or user can be set as a project leader. This option only appears when that group or user was denied the Project Leader capability (prior to 2020.1). That denied capability needs to be removed before they can be set as a project leader.

Once a permission rule has been used to establish a group or user as a project leader, the templates and capabilities are no longer editable because all capabilities are allowed for project leaders. If a project leader is established on a project that contains nested projects, they will have inherited project leader status on all nested projects and their content.

Project leader status is always applied downward through the entire project hierarchy and can only be removed from the level where it was set. To remove project leader status, follow the same steps as above but select Remove as Project Leader from the action menu.

Once a group or user has been removed as project leader, that permission rule will have all capabilities set to Unspecified. This may mean their access to and capabilities for that project will be removed if there is no other permission rule giving them permissions to the content. To keep their access to the project and its content, they will need to have capabilities set like any other group or user.

Lock content permissions

Permission rules set at the project level act as a default for content saved in that project and any nested projects it contains. Whether those project-level default rules are enforced or only preliminary depends on the content permission setting. This setting can be configured in two ways, either Locked (recommended) or Customizable. Locking a project removes the ability for content owners to modify the permission rules on their content. Locking permissions can be applied to nested projects or just to the parent project itself.
When the content permissions are **locked (including nested projects)**, permission rules set at the project level are enforced for all content in the project and all nested projects. (This was the default behavior for locking projects prior to 2020.1)

When the content permissions are **locked** (not including nested projects), permission rules set at the project level are enforced for content in the project, but nested projects can be configured independently with their own permission rules and as locked or customizable. (This is new behavior for locking projects as of 2020.1)

When the content permissions are **customizable**, permission rules set at the project level are applied to all content in the project by default. However, permission rules can be modified for individual pieces of content during or after publishing. (This was called Managed by the owner prior to 2020.1)

**Note:** Whether permission rules are locked or customizable, the permissions on content are always applied. Locked and customizable refer only to how project-level permissions are inherited by content in the project and who can change them. Even in a project with customizable permissions, only specific users can modify permissions (content or project owner, project leader, admins, or those with the Set Permission capability).

In a locked project:

- The project permission rules per content type are applied to all content.
- Only administrators, project owners, and project leaders can modify permissions.
- Content owners lose the Set Permission capability but retain all other capabilities on their content.
- Permissions are predictable for all content in the project.

In a customizable project:

- The project permission rules are applied by default when content is published into the project or nested projects are created, but permissions can be modified during publication or after the content is created.
- Any user with the Set Permissions capability can modify permission rules for that content.
- Content owners have all capabilities on their content.
- Permissions can be different across content in the project.
Set content permissions (lock a project)

New top-level projects inherit all initial permission rules from the Default project but not the content permissions setting, which is set to **Customizable**. This can be changed to **Locked** if desired.

**To configure the Content Permissions:**

1. You must be logged into the site as an administrator, project owner, or project leader
2. Open the permissions dialog for a project
3. Click the Content Permissions **Edit** link in the upper left and select the desired option in the Content Permissions dialog

![Content Permissions](image)

**Note:** If the upper left corner doesn’t show an **Edit** link in step 3 above, you may be on the permissions dialog for a (a) nested project or a piece of content in a locked project, in which case the link should bring you to the managing project, (b) piece of content in a customizable project, which won’t show anything, or (c) view, which will indicate how the view permissions are tied to the workbook. For more information on the interplay of permissions for views and workbooks, see Show or Hide Sheet Tabs.

Change content permissions

When the content permission setting for a project is changed, the outcome depends on the new setting. Changes to permission rules in a locked hierarchy must be done at the level of
the managing project.

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<thead>
<tr>
<th>Changing from</th>
<th>Changing to</th>
<th>Outcome</th>
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<tbody>
<tr>
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<td>Locked</td>
<td>Doesn't modify existing permission rules. Any nested projects become customizable.</td>
</tr>
<tr>
<td></td>
<td>Customizable</td>
<td>Doesn't modify existing permission rules, though they become customizable. Any nested projects become customizable.</td>
</tr>
<tr>
<td>Locked</td>
<td>Locked (including nested projects)</td>
<td>Overwrites existing custom permission rules for all nested projects and their content. This can't be undone.</td>
</tr>
<tr>
<td></td>
<td>Customizable</td>
<td>Doesn't modify existing permission rules, though they become customizable. Any nested projects retain their content permission settings and permission rules.</td>
</tr>
<tr>
<td>Customizable</td>
<td>Locked (including nested projects)</td>
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</tr>
<tr>
<td></td>
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<td>Overwrites existing custom permission rules for content in the project. This can't be undone. Any nested projects retain their permission rules and remain customizable.</td>
</tr>
</tbody>
</table>
Move projects and content

Move content

When content is moved between projects with different permission settings, content permission settings determine the logic of how permissions are applied.

- Moving content into a locked project will override the existing permission rules and enforce the destination’s permissions.
- Moving content into a customizable project will maintain the existing permission rules on the content.

Move projects

When a project is moved into another project, the permissions settings on the item being moved are maintained unless the destination project is scoped to include nested projects. (Project permissions in this case mean the View and Publish capabilities for the project itself.)

- If the destination project is set to locked (including nested projects), the permissions for the project being moved and its content are overwritten.
- If the destination project is set to locked (not including nested projects), the permissions for the project being moved are not overwritten. Whether or not the moved project is locked or customizable is preserved from its original setting.
- If the destination project is set to customizable, the permissions for the project being moved are not overwritten but they are now editable.

If the project being moved was previously nested under a parent that was locked (including nested projects), when moved, the project takes on the setting of locked (including nested projects) and becomes the managing project for any projects it contains. Note: This is the same outcome if a project is moved to become a top-level project.

Effective permissions

A permission rule establishes who is impacted (a group or user) and what Capabilities they are Allowed, Denied, or Unspecified. While it seems straightforward to simply set a
permission rule and have that be the whole story, whether a user has a capability may be unclear because of membership in multiple groups and the interplay of site roles and ownership with permission rules.

Multiple factors are evaluated in a specific order, yielding effective permissions on a piece of content.

Tip: To help keep things as straightforward as possible, we recommend (1) setting permission rules for groups instead of users, (2) managing permissions locked at the project level instead of setting permissions on individual content, and (3) deleting the All User group’s permission rule or setting all capabilities to None.

A capability is allowed for a user if and only if the following three conditions are all met:

- The capability is within the scope of their site role.
- They have that capability:
  - based on a specific user scenario (such as being the content owner or a project leader, or they’re an administrator site role),
  OR
  - because they have been allowed the capability as a user,
  OR
  - because they are both in a group that has been allowed the capability and no rules deny them the capability as a user or member of another group.
- There is no conflicting permissions settings at another content level that takes precedence.

Any other situation denies the user the capability.

Hovering over a capability brings up a tooltip that explains the effective permission. Here are some common examples of why effective permissions—what the user can or can’t do in actuality—might appear different than what a given permission rule states:

- A user might have a capability they are denied in a permission rule because their site role includes it (administrators).
- A user might have a capability they are denied in a permission rule because their user scenario allows it (because they own the content or are a project owner or leader).
A user might lack a capability they are allowed in a permission rule because their site role doesn’t allow it.

A user might lack a capability they are allowed in a permission rule because a conflicting group or user rule denied it.

A user might lack a capability they are allowed in a permission rule at one level of content (such as a workbook) because another level of content denied it (such as a view).

Evaluate permission rules

Permissions in Tableau are restrictive. Unless a capability is granted to a user, they are denied permission. The following logic evaluates if a capability is allowed or denied for an individual:

1. **Site role**: If a site role doesn’t permit a capability, the user is denied. If the user’s site role does permit the capability, then specific user scenarios are evaluated.
   
   - For example, a Viewer site role can’t web edit. See General capabilities allowed with each site role for more information on what each site role can do.

2. **Specific user scenarios**:
   
   - If the user is an admin they have all capabilities on all content.
   - If the user is a project owner or project leader, they have all capabilities on all content in their projects.
   - If the user is the content owner, they have all capabilities* on their content.
   - If these scenarios do not apply to the user, then user rules are evaluated.

   *Exception: Content owners won’t have the Set Permissions capability in projects where permissions are locked. Only administrators, project owners, and project leaders can set permission rules in locked projects.

3. **User rules**: If the user is denied a capability, it is denied. If they are allowed a capability, it is allowed. If a capability is unspecified, then group rules are evaluated.
4. **Group rules:** If the user is in *any* group that is denied a capability, it is denied. If the user is in a group that is allowed a capability (and not in any groups that are denied that capability), it is allowed.
   - That is to say, if a user is a member in two groups, and one is allowed a capability and one is denied the same capability, the denial takes precedence for that user and they are denied.
5. If none of the above conditions apply, the user is denied that capability. In effect, this means that capabilities left as unspecified will result in denied.

A final effective permission of *Allowed* therefore occurs in three circumstances:

- Allowed by site role (Server Administrator, Site Administrator Creator, Site Administrator Explorer)
- Allowed because the user is the content owner, project owner, or project leader
- Allowed by a group or user rule (and not denied by a rule of higher precedence)

*Denied* occurs in three circumstances:

- Denied by site role
- Denied by a rule (and not allowed by a rule of higher precedence)
- Not granted by any rule

Evaluate permissions set at multiple levels

If project content permissions are *customizable*, it's possible to configure permission rules in multiple places. There are specific rules that determine what permissions are applied on the content.

- If there are nested projects, permissions set at the child level take precedence over permissions set at the parent level.
- Changes to permissions at the project level are not enforced for existing content.
- If there are permissions set on content (workbook, data source, or flow) during or after publication, these take precedence over rules set at the project level.
- If a workbook doesn't show navigational sheet tabs, any changes to the workbook-level permissions won't be inherited by the views and any changes to permissions must be done on the view.
- Configuring the workbook to show navigational sheet tabs will override existing view-level permissions and sync them with the workbook-level permissions. See Show or Hide Sheet Tabs.
This image shows how capabilities are evaluated through multiple levels of content.

Permissions on views

In a workbook that is not in a locked project and does not show sheets as tabs for navigation, views (sheets, dashboards, stories) inherit the workbook permissions at publication, but any changes to permission rules must be made on individual views. View capabilities are the same as those for workbooks, except for Overwrite, Download Workbook/Save a Copy, and Move which are only available at the workbook level.

We recommend showing navigational sheet tabs whenever possible so views continue to inherit their permissions from the workbook. For more information, see Show or Hide Sheet Tabs.
Permissions, Site Roles, and Licenses

Adding a user to a Tableau Server requires a license. (Users can also be added as unlicensed and configured so they will consume a license only when they first sign in. For more information, see Grant License on Sign In.) For each site the user belongs to they have exactly one site role, restricted by their license. A user has permissions for content on the site, restricted by what their site role allows.

Licenses and site roles apply to users. Permission capabilities apply to content.

**Licenses** are assigned to a user when they are created (or sign in for the first time) on the Tableau Server or Tableau Online site. Users are licensed as a **Creator**, **Explorer**, or **Viewer**.

- License levels are consumed based on the maximum *site role* a user can have on that server.
  - Server Administrator, Site Administrator Creator, and Creator site roles use a Creator license.
  - Site Administrator Explorer, Explorer (can publish), and Explorer site roles use at least an Explorer license.
  - Viewer site role uses at least a Viewer license.
  - An unlicensed user can exist on the server but they cannot log in unless they were added with grant site role on sign in.
  - For Tableau Online, a user consumes a license per site and has only one site role.

**Site roles** are assigned to a user for each site they are a member of.

- Site roles determine the maximum capabilities a user can have in that site. (For example, a user with a site role of Viewer will never be able to download a data source even if that capability is explicitly granted to them on a specific data source.)
- Site roles do not inherently grant any capabilities in and of themselves—with the exception of the administrator site roles. Administrators always have all capabilities applicable to their license level.

**Permissions** consist of **capabilities**, like the ability to save to a project, web edit a workbook, connect to a data source, etc. They apply to group or user on a specific piece of content (project, data source, workbook, view, or flow).
Permission capabilities are not given to a group or user in a vacuum but rather in the context of content. A user can have different capabilities for different content assets.

Permissions are evaluated based on the interplay of a user’s site role and the permission rules for that user or any groups they are members of.

Some actions such as web authoring might require combinations of capabilities. For more information, see Permission settings for specific scenarios.

Site roles and their maximum capabilities

These tables indicate what capabilities are available to each site role. There may be other ways for a user with a site role to perform a similar action. For example, although Viewers can’t be given the Share Customized capability to make their custom views visible to others on the workbook, they can share custom views by copying the view URL. See General capabilities allowed with each site role for more information on what each site role can do.

Projects

<table>
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<tr>
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<td>✏ View</td>
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Workbooks

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## Tableau Online Help

- **Add Comments**
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- **Download Image/PDF**
  - [ ]

- **Summary Data**
  - [ ]

- **Run**
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- **Explain Data**
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- **Share Customized**
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- **Download Full Data**
  - [ ]

- **Web Edit**
  - [ ]

- **Download Workbook/Save a Copy**
  - [ ]

- **Overwrite**
  - [ ]

- **Create/Refresh Metrics**
  - [ ]

- **Move**
  - [ ]

- **Delete**
  - [ ]
† Prior to Tableau 2021.3, the availability of Explain Data was controlled at the server level only using the tsm configuration set option ExplainDataEnabled. In 2021.3 and later, availability of Explain Data can be controlled in site settings and in a workbook using the Run Explain Data capability. The availability of Explain Data in viewing mode is controlled in a workbook in the Explain Data Settings dialog box.

‡ Prior to Tableau 2021.3, the Create/Refresh Metrics capability was controlled by the Download Full Data capability.
Flows

To run flows on a schedule, you must have the *Data Management*. For information about configuring flow settings, see *Create and Interact with Flows on the Web*.

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Tableau Online Help
### Set Permissions

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### Ask Data Lenses

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### Metrics

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### Collections

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### Virtual Connections

Virtual connections require a Data Management license. See About Data Management for details.

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* Although the Explorer role can be given the Move capability, they can’t have the Publish capability on a project and therefore there is no place for them to move content to. The Move capability should therefore be considered not possible for Explorer site roles.
Quick Start: Permissions

A permission rule is a set of capabilities that defines what access a group or user has to a piece of content, such as a workbook, project, or data source.

The most efficient way to manage permissions is to remove permissions from the **All Users** group before you create new groups for your environment. Then create permission rules for groups at the project level.

1. **Add users to groups**

A common way to manage permissions is to create groups for users who should have the same permissions.

   1. Within a site, select **Groups**.
   2. Select a group name, and then select **Add Users**.
A maximum of ten results will be returned.

2 Open a project's permissions settings

The site's **Content** page shows the top-level projects. Navigate to the project you want to update, select its **Actions (…) menu**, and then select **Permissions**.

If you’re not sure where to find a child project, display filters, and select **Show all projects**.

3 Create a permissions rule

Click **Add a user or group rule**, select **Group**, and then find and select the group.
Select a permissions 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.

4 View a user’s effective permissions

After you save the permissions 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.

For more information, see Permissions.

Site roles

A user’s site role determines the maximum permissions allowed for that user.

- Server and site administrators can access all site content and take actions on it.
- Owners always get full access to the content they’ve published. When the parent project permissions are not locked, owners can change permissions for their published content.

For more information, see Set Users’ Site Roles and Use Projects to Manage Content Access.

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 best-practice steps describing how to implement permissions, see Configure Projects, Groups, and Permissions for Managed Self-Service.
Manage Content Ownership

When you publish a data source or workbook on Tableau Online or when you create a project, you become its owner. A content owner, a project leader with an appropriate site role, or an administrator can change ownership of a content asset. After ownership is reassigned, the original owner has no special connection to the content item, and their ability to access it is determined by their permissions on the project or that specific item.

Who can change or be given ownership, by content type

Whether you can change or be given ownership depends on your permissions and your relationship to the content asset, as described in the following table.

**Note:** Full project leader access is available only with some site roles. For information, see Project-level administration.

<table>
<thead>
<tr>
<th>Content asset type</th>
<th>Who can change ownership</th>
<th>Who can be given ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-level projects</td>
<td>Server administrator¹</td>
<td>Server administrator</td>
</tr>
<tr>
<td></td>
<td>Site administrator</td>
<td>Site administrator (Creator and Explorer)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explorer (can publish)</td>
</tr>
<tr>
<td>Child (nested) projects</td>
<td>Server administrator</td>
<td>Any administrator or owner, excluding Explorer and Viewer.</td>
</tr>
<tr>
<td></td>
<td>Site administrator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project owner</td>
<td></td>
</tr>
<tr>
<td>Workbooks and data</td>
<td>Server administrator</td>
<td>Server administrator</td>
</tr>
</tbody>
</table>
| **sources** | Site administrator  
Workbook or data source owner  
Project leader or owner of the project that contains the item | Site administrator  
Creator  
Explorer  
Viewer |
| --- | --- | --- |
| **Metrics** | Server administrator  
Site administrator  
Metric owner  
Project leader or owner of the project that contains the item | Any administrator or user of the site, excluding Explorer and Viewer. |
| **Ask Data lenses** | Server administrator  
Site administrator  
Lens owner  
Project leader or owner of the project that contains the item | Any administrator or user of the site, excluding Explorer and Viewer. |
| **Flows** | Server administrator  
Site administrator | Server and site administrators can only change the owner to themselves. |
### Data Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Server administrator</th>
<th>Site administrator</th>
<th>Data role owner</th>
<th>Project leader or owner of the project that contains the item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any administrator or user of the site, excluding Explorer and Viewer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Collections

<table>
<thead>
<tr>
<th>Role</th>
<th>Server administrator</th>
<th>Site administrator</th>
<th>Collection owner</th>
<th>Creator</th>
<th>Viewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server administrator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site administrator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collection owner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explorer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Virtual Connections

<table>
<thead>
<tr>
<th>Role</th>
<th>Server administrator</th>
<th>Site administrator</th>
<th>Virtual connection owner</th>
<th>Creator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server administrator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site administrator</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual connection owner</td>
<td></td>
<td></td>
<td></td>
<td>Creator</td>
</tr>
</tbody>
</table>

1 The Server Administrator site role applies to Tableau Server only; not Tableau Online.

2 Virtual connections require Data Management. See About Data Management for details. Note that to edit a virtual connection, you must have the database credentials.

### Considerations for changing content ownership

- Before you remove a user from Tableau Online, make sure they do not own any content assets.
If the user does own content, you must first reassign ownership of those assets before you can delete the user. Otherwise, their site role is set to **Unlicensed**, but they are not deleted, and only an administrator can take certain actions on that content.

- If you change the ownership of a workbook or data source that includes embedded credentials to connect to underlying data, the embedded credentials will be deleted. For flows, embedded credentials are preserved when changing ownership. Connections to published data sources are authenticated using the flow owner and authorized based on their permissions.

You can update the embedded credentials by editing the connection information on Tableau Online. For more information, see Edit Connections on Tableau Online. Alternatively, the new owner can download the flow, workbook, or data source and open the item in Tableau Desktop to update the embedded credentials and then republish the content.

- If you do not lock permissions to projects, make sure users you give content ownership to know your permissions guidelines, or you account for permissions as you change ownership. In unlocked projects, by default, content owners can set permissions on their content. For more information, see Permissions.

- While it is possible to change the owner of a metric to a user with a site role of Viewer or Explorer, it is not recommended, because doing so will cause the metric refresh to be suspended. A site role of Creator or Explorer (can publish) is required to refresh, overwrite, or delete a metric.

**Change the owner of a content resource**

1. Sign in to the Tableau Online web environment, and from the navigation menu, select **Explore**.

2. Navigate to the content you want to assign to someone else.
If you want to reassign multiple of the same type of content, for example, multiple workbooks, select the content type from the drop-down menu.

If you want to reassign multiple items within the same project, navigate to the project.

If you’re not sure where to find a child project, display filters, and select Show all projects.

If you want to reassign multiple content items with the same owner, find the user on the Users page.

3. Select the items you want to reassign, and then select Actions > Change Owner.

The other menu commands you see will depend on the content type.

4. Type the name of a user or select a user from the list.
5. Click **Change Owner**.

### Manage Permissions for External Assets

Tableau Online and Tableau Server provide a space for accessing and managing published content. When Tableau Online or Tableau Server is licensed with Data Management, you have access to Tableau Catalog. Tableau Catalog adds a complementary space and a set of features across your site to track and manage metadata and lineage of external assets used by the content published to your site.

**Tableau Catalog indexes content and assets**

Catalog discovers, tracks, and stores metadata from the content that you publish to Tableau Online or Tableau Server.

**Catalog indexes metadata for the following:**

- **Tableau content**: workbooks, data sources, flows, projects, metrics, virtual connections, virtual connection tables, users, and sites

- **External assets**: databases and tables associated with Tableau content

  Catalog classifies the metadata of any data that comes from outside the Tableau environment as external assets. The data that comes from outside the Tableau envir-
Data is stored in many different formats, such as a database server or a local .json file.

Catalog tracks only the metadata of the external data and does not track the underlying data in any form (raw or aggregated).

Catalog metadata includes the following:

- **Lineage information** or the relationship between items. For example, the Sales table has a relationship with both the Superstore data source and the Superstore Sample workbook.

- **Schema information.** Some examples include:
  - Table names, column names, and column types. For example, Table A contains Columns A, B, and C, which are types INT, VARCHAR, and VARCHAR.
  - Database name and server location. For example, Database_1 is a SQL Server database at http://example.net.
  - Data source name, and the names and types of the fields the data source contains. For example, Superstore data source has fields AA, BB, and CC. Field CC is a calculated field that refers back to both field AA and field BB.

- **User curated, added, or managed information.** For example, item descriptions, certifications, user contacts, data quality warnings, and more.

How does Tableau Catalog work?

Tableau Catalog indexes all content published to Tableau Online or Tableau Server to track lineage and schema metadata. For example, the metadata comes from workbooks, packaged workbooks, data sources, and the Tableau Server or Tableau Online repository.

As part of the indexing process, lineage and schema metadata about external assets (databases and tables) used by the published content are also indexed.

**Note:** In addition to accessing Catalog from Tableau Online or Tableau Server, indexed metadata can also be accessed from the Tableau Metadata API and Tableau Server REST API. For more information about the Tableau Metadata API or metadata methods in
the REST API, see Tableau Metadata API and Metadata Methods in the Tableau Server REST API, respectively.

Permissions on metadata

Permissions control who is allowed to see and manage external assets and what metadata (for both Tableau content and external assets) is shown through lineage.

**Note:** If Tableau Online or Tableau Server is not licensed with Data Management, then by default, only admins can see database and table metadata through the Tableau Metadata API. This default can be changed to use "derived permissions," as described below.

Access metadata

The permissions used to access metadata through Catalog (or Metadata API) work similarly to permissions for accessing content through Tableau Online or Tableau Server, with some additional considerations for sensitive data that can be exposed through lineage and the capabilities granted on external assets.

**Permissions on Tableau content**

Catalog uses view and manage capabilities that are already used by existing Tableau content to control the metadata that you can see and manage on Tableau content. For more general information on these capabilities, see Permissions.

**Permissions on external assets using derived permissions**

When Tableau Online or Tableau Server is licensed with Data Management, by default Catalog uses *derived permissions* to automatically grant you capabilities to external assets in the following scenarios:

For **View** capability:

- If you are the owner of a workbook, data source, or flow, you can see the database and table metadata used *directly* by that workbook, data source, or flow. See
Additional notes about lineage.

- If you are a project owner or project leader, you can see all the database and table metadata used by the content published to your project.

- Embedded files use the permissions of the source (such as the workbook, data source, or flow), rather than the derived permissions of the external asset (the database or table). For example, if you can see the workbook with an embedded file, you can see the embedded file and its metadata used by that workbook.

For both **Overwrite** and **Set Permissions** capabilities:

- If you are the owner of a flow, you can edit and manage permissions for the database and table metadata used by the flow output.

**Note:** For the flow cases above, the capabilities apply only after there has been at least one successful flow run under the current owner of the flow.

**Check permissions**

As an admin or someone who has been given the capability to set permissions for an asset, you can validate who has derived permissions by following the steps below.

1. Sign in to Tableau Online or Tableau Server.

2. From the left navigation pane, click **External Assets**.

3. From the drop-down menu, select **Databases and Files** or **Tables**.
   **Note:** Local files, like .json or .csv files are grouped as external assets under **Data-bases**.

4. Select the check box next to the database or table whose permissions you want to modify, and then select **Actions > Permissions**.

5. In the Permissions dialog box, click **+ Add Group/User Rule** and start typing to
search for a group or user.

6. Validate the permissions by clicking a group name or user name in the permission rules to see the effective permissions below.

![Image of Permissions page in Tableau Online]

**Order of precedence in which Tableau evaluates derived permissions for external assets**

When derived permissions are configured for your Tableau Online site or Tableau Server, each user’s level of access to external assets depends on the associated Tableau content and the order of precedence of rules Tableau uses for its content.

Tableau follows the rules below, continuing on to the next rule, only if the current rule evaluates to “denied.” If any rule evaluates to “allowed,” the capability is allowed and Tableau stops evaluating. This rules list is based on the Permissions.

**For View capability:**

1. Admin role
2. License
3. Project leader (Tableau content)
4. Project owner (Tableau content)
5. Content owner (Tableau content)
6. *Derived permissions* (applies only to external assets and the View capability)
   a. Admin role
   b. License
   c. Project leader (external assets)
   d. Project owner (external assets)
   e. Content owner (external assets)

7. Explicit permissions

For **Overwrite** and **Set Permissions** capabilities:

1. Admin role
2. License
3. Project leader (Tableau content)
4. Project owner (Tableau content)
5. Content owner (Tableau content)
6. Explicit permissions (Tableau content)
7. *Derived permissions* (applies only to external assets and the Overwrite and Set Permissions capabilities for flow outputs)
   a. Admin role
   b. License
   c. Project leader (external assets)
   d. Project owner (external assets)
   e. Content owner (external assets)

**Turn off derived permissions**

As an admin, you can turn off the derived permissions default setting for a site in favor of manually granting explicit permissions to databases and tables.

1. Sign in to Tableau Online or Tableau Server as an admin.
2. From the left navigation pane, click **Settings**.
3. On the General tab, under Automatic Access to Metadata about Databases and Tables, clear the **Automatically grant authorized users access to metadata about databases and tables** check box.
Set permissions on individual external assets

In order to grant additional users permissions to view, edit (overwrite), and manage external assets, an admin can grant those capabilities explicitly on individual databases or tables for users or groups.

**Database permissions act as a permissions template**

Database permissions function like Permissions. In other words, when permissions are set at the database level, those permissions can serve as a template for any newly discovered and indexed child tables of that database. Furthermore, database permissions can also be locked so that the child tables will always use the permissions set at the database level.

Granting permission at the database level can help create a scalable process for enabling permissions to tables.

**Summary of permissions capabilities**

The following table shows the capabilities you can set for external assets (databases and tables):

<table>
<thead>
<tr>
<th>Capability</th>
<th>Description</th>
<th>Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>View</td>
<td>See the database or table asset.</td>
<td>View</td>
</tr>
<tr>
<td>Overwrite</td>
<td>Add or edit data quality warnings and descriptions of the database or table asset. Prior to version 2020.1, the Overwrite capability was called Save.</td>
<td>Publish</td>
</tr>
<tr>
<td>Set Per-</td>
<td>Grant or deny permissions for the database or table asset.</td>
<td>Administer</td>
</tr>
</tbody>
</table>
Note: In Tableau Online June 2022, there is an additional capability, Move, that is set using the REST API. See the Move Database and Move Table methods in the REST API reference for more information.

Set permissions on a database or table

To set permissions on databases or tables, use the following procedure.

1. Sign in to Tableau Online or Tableau Server as an admin or someone who has been granted the "Set Permissions" capability.

2. From the left navigation pane, click External Assets.

3. From the drop-down menu, select Databases and Files or Tables.
   Note: Local files, like .json or .csv files are grouped as external assets under Databases.

4. Select the check box next to the database or table whose permissions you want to modify, and then select Actions > Permissions.

5. In the Permissions dialog box, click + Add Group/User Rule and start typing to search for a group or user.

6. Select a permission role template to apply an initial set of capability for the group or user, and then click Save. Available templates are: View, Publish, Administer, None, and Denied.

7. To further customize 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.

8. Configure any additional rules you want for other groups or users.
9. Validate the permissions clicking a group name or user name in the permission rules to see the effective permissions below.

![Permissions](image)

**Lock permissions to the database**

To lock (or unlock) permissions to the database, use the following procedure.

1. Sign in to Tableau Online or Tableau Server as an admin or someone who has been granted the "Set Permissions" capability.

2. From the left navigation pane, click **External Assets**. By default, the External Assets page shows a list of databases and files.

3. Select the check box next to the database whose permissions you want to lock, select **Actions > Permissions**, and then click the Table Permissions **Edit** link.

4. In the Table Permissions in Database dialog box, select **Locked** and click **Save**.

5. To unlock permissions, click **Edit** again, and select **Customized**.

**Note:** In Tableau Online 2022.2, you can move external assets into projects using the REST API. A database in a project cannot have its permissions locked. Instead,
database and table permissions behave like other assets, and permissions can be controlled using projects. For more information on managing permissions with projects, see Manage Permissions with Projects. For more information on using the REST API to move external assets, see the Move Database and Move Table methods in the REST API reference for more information.

Access lineage information

Catalog (and the Metadata API) can expose relationship and dependencies metadata, also referred to as lineage, among the content and assets on Tableau Online or Tableau Server. Lineage can show three primary things:

- How items relate to each other, either directly or indirectly
- How many of those items relate to each other
- With the appropriate permissions, shows sensitive data about items in the lineage

Sensitive lineage data

In some cases, lineage can contain sensitive data, such as data quality warning messages, content or asset names, or related items and metadata.

By default, complete lineage information displays for all users while its sensitive data is blocked from specific users who don’t have the appropriate View capabilities. The concept of blocking sensitive data is called obfuscation.

Obfuscation allows all metadata in the lineage to be visible while keeping its sensitive data blocked from specific users who don’t have the appropriate View capabilities. This default enables workflows that rely on a complete impact analysis.

If obfuscating sensitive data in the lineage is not enough for your organization, certain parts of the lineage, including its sensitive data, can be filtered.

Filtering omits certain parts of the lineage (and lineage-related areas like data details) for specific users who don’t have the appropriate View capabilities to its sensitive data. Because filtering omits parts of lineage, it prevents workflows that rely on a complete impact analysis.
To change how sensitive data is handled, do the following:

1. Sign in to Tableau Online or Tableau Server as an admin.
2. From the left navigation pane, click **Settings**.
3. On the General tab, under **Sensitive Lineage Information**, select the radio button that best handles lineage information for all users on your Tableau Online site or Tableau Server.

**Additional notes about lineage**

- **If you have the View capability on related assets**, you can see when and what assets and content are related to each other, and their sensitive metadata.

  For example, you can see 1) the names, data quality warnings, and total number of related upstream databases and tables and 2) the combined number of sheets (visible and hidden) in the lineage of the downstream workbook of the asset you are evaluating.

- **If you don’t have the View capability on related assets**, you can always see when assets relate to each other.

  For example, you can see 1) whether related upstream databases and tables exist in the lineage and 2) the total number of databases or total number of tables that are related to the asset you are evaluating.

  However, you can’t see the metadata associated with those assets when you don’t have the view capability for them. When metadata is blocked because of limited permissions, or the asset is in a Personal Space, you see **Permissions Required**.
If you don’t have the View capability on related assets, you can always see whether the assets are certified.

However, the level of detail that you can’t see if you don’t have View capability is the sensitive information related to the certification, like the names of the related databases and tables. When metadata is blocked because of limited permissions, or the asset is in a Personal Space, you see Permissions Required.
For more information about lineage see Use Lineage for Impact Analysis.

**Additional notes about tags discoverable through lineage data**

In addition to Tableau content, external assets can also be tagged. Although tags are always visible, tagged items that you see through lineage data can either be obfuscated (default) or filtered as described earlier in this topic.

When tagged items are obfuscated:

- **If you have the View capability for tagged items**, you can see the tagged items and related tagged items, and all metadata.

- **If you don’t have the View capability for tagged items:**
  
  - You can see the type of tagged and related tagged items but you can't see sensitive metadata about the items. For example, suppose you use a tag filter to see items with the tag “Noteworthy.” Although you can see that there are database items tagged with "Noteworthy," you can’t see the names of the tagged databases.
You can see how many related tagged items there are. For example, suppose you do a tag query on "Noteworthy." Your query returns five tagged databases.

When tagged items are filtered, the tagged and related tagged items you see are limited to only the items that you have the View capability for.

For more information about tags, see Tagged Items in the Tableau User Help.

**Potential mismatch between asset results and content results**

When Catalog shows lineage information, it provides information about content and assets. Catalog lineage always shows the true count or result of associated items. However, elsewhere in Tableau Online or Tableau Server, you might see fewer number of items. One reason for this is because of your View capabilities. Outside of Catalog, or elsewhere in Tableau Online or Tableau Server, you see a filtered count or result of the content that you have access to according to your content permissions.

For example, suppose you're looking at the Superstore data source. The lineage for the Superstore data source can show how many upstream underlying tables the data source connects to and how many downstream workbooks rely on the data source. However, because you might not have the View capability on all of those downstream workbooks, the total number of related workbooks might be different when you're looking at Catalog lineage information versus the total number of workbooks represented in the Connected Workbooks tab.

There might be other reasons, unrelated to permissions, why you might see a mismatch between asset counts and content counts. For more information, see Use Lineage for Impact Analysis.

Who can do this

The following information summarizes the types of users who can do the tasks described in this topic.

**Tableau Online site or Tableau Server admin**
<table>
<thead>
<tr>
<th>Data Management</th>
<th>Capability</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licensed</td>
<td>See assets and their metadata</td>
<td>None</td>
</tr>
<tr>
<td>Data Management</td>
<td>Capability</td>
<td>Requirements</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Edit assets and their metadata</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Change permission on assets and their metadata</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to see assets and their metadata</td>
<td><strong>Default:</strong> When “derived permissions” is on, your users can see metadata on external assets for the content that they own, or for the content that is published to a project that they are a project leader or project owner of. <strong>Ad-hoc:</strong> You can configure explicit View permissions on a specified external asset.</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to edit assets and their metadata</td>
<td>You can configure explicit &quot;write&quot; or <strong>Overwrite</strong> permissions on a specified external asset (if not automatically granted because the user is a flow owner).</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to change permissions on assets and their metadata</td>
<td>You can configure explicit &quot;edit&quot; or <strong>Set Permissions</strong> on a specified external asset (if not automatically granted because the user is a flow owner).</td>
</tr>
<tr>
<td>Data Management</td>
<td>Capability</td>
<td>Requirements</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Not licensed</td>
<td>See all assets and their metadata</td>
<td>Applies to Metadata API only</td>
</tr>
<tr>
<td></td>
<td>Edit assets and their metadata</td>
<td>Requires the Data Management</td>
</tr>
<tr>
<td></td>
<td>Change permission on assets and their metadata</td>
<td>Requires the Data Management</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to see assets and their metadata</td>
<td>Applies to Metadata API only: You can turn on derived permissions as described above. If “derived permissions” is on, your users can see metadata on external assets for the content that they own, or for the content that is published to a project that they are a project leader or project owner of.</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to edit assets and their metadata</td>
<td>Requires the Data Management</td>
</tr>
<tr>
<td></td>
<td>Grant users ability to change permissions on assets and their metadata</td>
<td>Requires the Data Management</td>
</tr>
</tbody>
</table>

User with Creator or Explorer license
<table>
<thead>
<tr>
<th>Data Management</th>
<th>Capability</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| Licensed        | See assets and their metadata       | **Default:** When "derived permissions" is enabled by your Tableau Online site admin or Tableau Server admin, you can see metadata on external assets for the content that you own, or for the content that is published to a project that you are a project leader or project owner of.  
**Ad-hoc:** You can see metadata on external assets that you have been granted explicit **View** permissions to. |
<p>|                 | Edit assets and their metadata      | You can edit metadata on an external asset that you have been granted explicit &quot;write&quot; or <strong>Overwrite</strong> permissions to (if not automatically granted because the user is a flow owner). |
|                 | Change permissions on assets and their metadata | You can change permissions on an external asset that you have been granted explicit &quot;edit&quot; or <strong>Set Permissions</strong> to (if not automatically granted because the user is a flow owner). |
|                 | Grant other users permissions to see | You can change per- |</p>
<table>
<thead>
<tr>
<th>Data Management</th>
<th>Capability</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>assets and their metadata</td>
<td>missions on an external asset that you have been granted explicit &quot;edit&quot; or <strong>Set Permissions</strong> to ((if not automatically granted because the user is a flow owner).</td>
</tr>
<tr>
<td>Not licensed</td>
<td>See assets and their metadata</td>
<td><strong>Applies to Metadata API only:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If “derived permissions” is enabled by your Tableau Online site admin or Tableau Server admin, you can see metadata on external assets for the content that you own, or for the content that is published to a project that you area project leader or project owner of.</td>
</tr>
<tr>
<td></td>
<td>Edit assets and their metadata</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change permissions on assets and their metadata</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grant other users permissions to see assets and their metadata</td>
<td>Requires the Data Management</td>
</tr>
</tbody>
</table>

**Enable Tableau Catalog**

**Tableau Catalog** discovers and indexes all of the content on your Tableau Online site or Tableau Server, including workbooks, data sources, sheets, metrics, and flows. Indexing is
used to gather information about the content, or metadata, about the schema and lineage of the content. Then from the metadata, Catalog identifies all of the databases, files, and tables used by the content on your Tableau Online site or Tableau Server.

Catalog is available with the Data Management license. For more information, see About Data Management.

In addition to Catalog, metadata about your content can also be accessed from both the Tableau Metadata API and the Tableau REST API using Metadata Methods.

Catalog on Tableau Online

Catalog is automatically enabled when Tableau Online is licensed with the Data Management.

After your Tableau Online site has been licensed with the Data Management, the content that already exists on your Tableau Online site is immediately indexed. The time it takes to index the content depends on the amount of content you have. After the content is initially indexed, Catalog monitors newly published content and other changes to assets and continues to index in the background.

Troubleshoot Catalog

You or your users might encounter one of the following issues when using Catalog.

Timeout limit and node limit exceeded messages

To ensure that Catalog tasks that have to return a large number of results don’t take up all system resources, Catalog implements both timeout and node limits.

* Timeout limit

When tasks in Catalog reach the timeout limit, you and your users see the following message:
“Showing partial results, Request time limit exceeded. Try again later.” or TIME_LIMIT_EXCEEDED

- **Node limit**

  When tasks in Catalog reach the node limit, you and your users see the following message:

  NODE_LIMIT_EXCEEDED

**Disable Catalog**

As a Tableau Online site admin, you can disable Catalog by turning off its capabilities.

**Turn off Catalog capabilities**

(Requires Data Management)

You can turn off Catalog capabilities at any time. When Catalog capabilities are turned off, the features of Catalog, such as adding data quality warnings or the ability to explicitly manage permissions to database and table assets, are not accessible through Tableau Online. However, Catalog continues to index published content and the metadata is accessible from the Tableau Metadata API and metadata methods in the Tableau REST API.

1. Sign in to Tableau Online using your site admin credentials.

2. From the left navigation pane, click **Settings**.

3. On the General tab, under Tableau Catalog, clear the **Turn on Tableau Catalog** check box.

**Stop indexing metadata**

Indexing cannot be stopped for a Tableau Online site.
Use Certification to Help Users Find Trusted Data

In a self-service environment with multiple publishers, it’s common for a project on Tableau Online to contain a variety of content that is named similarly, or is based on the same or similar underlying data, or is published without any descriptive information about it. When this is the case, analysts might lack confidence about the data they should use.

To help your users find the data that’s trusted and recommended for their type of analysis, you can certify the data that complies with your organization’s data standards.

In addition to certifying published data sources, if you have a Data Management license for Tableau Server or Tableau Online:

- Starting in Tableau 2019.3, if Tableau Catalog is enabled, you can certify databases and tables that are associated with your Tableau content. (For more information about Tableau Catalog, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.)
- Starting in Tableau 2022.1, you can certify virtual connections and virtual connection tables.

How certification helps users find trusted data

When you certify an asset, users see a green badge or green check mark, depending on where the asset is being viewed.
Certified data sources rank higher in search results and are added to recommended data sources.

In addition, you can provide notes about the certification status, which appear when users click the badge, or in a tooltip when they hover over the data source icon in web authoring or Tableau Desktop. The information also shows who certified the data source.

For more information, see the How to certify data steps below.

Create guidelines for selecting data to certify

As with most Tableau functionality, certification is flexible. You can define for your organization the criteria you use to determine when to certify a data source (or database or table). As you do this, you might want to document and share your guidelines. As new data sources are published, the guidelines can help you and other administrators or project leaders to be consistent with your certification choices. They can also help users understand what certification means.

Whether you use the same certification criteria across all projects, or define unique criteria for each project, the important thing is to be clear about what certification means in your environment.
Who can certify data

To certify a data source, you must

- be a Server or Site Administrator, or
- have a site role of Explorer (Can Publish) or Creator and be the project owner or have the Project Leader capability for the project containing the data you want to certify.

To certify virtual connections and virtual connection tables, you must have a Data Management license in your environment, and you must

- be a Server or Site Administrator, or
- have a site role of Explorer (Can Publish) or Creator and be the project owner or have the Project Leader capability for the project containing the data you want to certify.

To certify databases or tables, you must have Tableau Catalog enabled in your environment, and you must

- be a Server or Site Administrator, or
- have the Set permissions capability on the database to certify that database or any tables within that database.

How to certify data

The data you can certify depends on whether you have a Data Management license, and if you do, if you have Tableau Catalog enabled in your environment.

- All users with the right permissions can certify data sources.
- If you have a Data Management license, users with the right permissions can also certify virtual connections and virtual connection tables.
- If Tableau Catalog is enabled, users with the right permissions can also certify databases, tables, and files.

Take the following steps to certify the data.

1. Sign in to Tableau Online.
2. This step depends on the type of asset you want to certify:
   - Data source or virtual connection - on the Explore page, select All Data Sources or All Virtual Connections.
Virtual connection - on the Explore page, select All Virtual Connections, and select the virtual connection that contains the virtual connection table you want to certify. Then select the virtual connection table.

Database or table - on the External Assets page, select Databases and Files or Tables.

3. On the page, select the More actions menu (...) next to the asset name you want to certify.

4. Select Edit Certification and then do the following:
   - Select the This data is certified check box.
   - Add a note that gives users context for the certification status, intended use for the data, or other helpful information, and then click Save.

Information you add to the Note section appears in the certification badge or tooltip, mentioned earlier in How certification helps users find trusted data.

Use Lineage for Impact Analysis

Knowing where your data comes from is key to trusting the data, and knowing who else uses it means you can analyze the impact of changes to data in your environment. The lineage feature in Tableau Catalog helps you do both these things.

Lineage requires Data Management. Starting in 2019.3, Tableau Catalog is available as part of the Data Management offering for Tableau Server and Tableau Online. When Tableau Catalog is enabled in your environment, you have access to lineage information for your content. For more information about Tableau Catalog, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.
Navigate lineage

How you navigate to the Lineage pane depends on what kind of asset you're working with.

To see the lineage for Tableau content such as workbooks, data sources, virtual connections, lenses, or flows, from Explore, navigate to and open the content asset, and then select the Lineage tab.

**Note:** Lineage data for flows won't show if the flow includes parameter values. For more information about using parameters in flows see Create and Use Parameters in Flows in the Tableau Prep help.

To see lineage for external assets, such as databases and tables, from External Assets, navigate to and select an asset from the list. When you select a table, for example, a page opens with information about that table, for example, the name, type, full name, description, columns, and details about each column. To the right of the table information is the Lineage pane, which shows the lineage for that table.
Lineage shows dependencies in relationship to the lineage anchor, which is the asset selected. A lineage anchor can be a database, table, workbook, published data source, virtual connection, virtual connection table, lens, metric, or flow. (In the first example, the anchor is the Batters data source and in the second example, it’s the Batters table). All the assets below the anchor depend, either directly or indirectly, on the anchor and are called outputs or downstream assets. The assets above the anchor are the assets the anchor is either directly or indirectly dependent on and are called inputs or upstream assets.

When you select a field in a data source or a column in a table, the lineage is filtered to show only downstream assets that depend on the field (or column) or upstream inputs to the field (or column) as in this ‘Superstore’ workbook example that shows the lineage filtered for the Commission (Variable) field:
You can select an upstream or downstream asset in the Lineage pane to see its details. For example, when you select Metrics, the list of metrics depending on this workbook appears to the left of the Lineage pane.

From the Lineage pane, you can navigate to any asset related to your initial choice, in this case the workbook, by following the links that interest you.

**Embedded asset appears in External Assets**

Tableau Catalog treats an external asset as ‘embedded’ if the **Include external files** check box is selected when a data source or workbook is published. When an external asset (database, table, or file) is embedded in published Tableau content (workbooks, data sources, and flows), the external asset is used by the content, but is not shareable with other users. That embedded external asset appears in the lineage upstream from its Tableau content and is listed in External Assets.

To see if an external asset is embedded, go to the external asset’s detail page and see if “Embedded Asset” is listed under **Category**.
For information about embedded data, see Publishing data separately or embedded in workbooks in Tableau Desktop and Web Authoring Help.

**Lineage and custom SQL connections**

When you view the lineage of a connection that uses custom SQL, keep in mind the following:

- Lineage might not be complete.
- Catalog doesn’t support showing column information for tables that it only knows about through custom SQL.
- Field details cards might not contain links to connected columns, or might not show any connected columns at all.
- Column details cards might not contain links to fields that use the column, or might not show any fields at all.

For more information, see Tableau Catalog support for custom SQL in the Tableau Desktop and Web Authoring Help.

**Catalog doesn’t support cubes**

Cube data sources (also known as multidimensional or OLAP data sources) are not supported by Tableau Catalog. Tableau content (such as a data source, view, or workbook) that relies on cube data does not display any cube metadata or cube lineage in Catalog.
Mismatch between lineage count and tab count

You might notice a mismatch in the count of assets between the Tableau Catalog Lineage tool and the tabs in Tableau Server or Tableau Online.

The count mismatch is explained by the fact that each—lineage count vs. tab count—counts assets a different way. For example, at any given point in time, Catalog can count only assets that are indexed, whereas Tableau Server or Tableau Online counts any assets that are published. Other reasons for count differences include whether:

- You have "View" permissions for the asset.
- An asset is hidden.
- Any fields are used in a workbook.
- An asset is directly or indirectly connected to.
- An asset is in a Personal Space.

Workbook count mismatch example

As an example, here's how the tab count vs. the lineage count is determined for workbooks.

Connected Workbooks tab counts workbooks that meet both these criteria:

- Connects to the data source (whether or not any fields are actually used in the workbook).
- The user has permissions to view (whether it's a worksheet, dashboard, or story).
Tableau Catalog Lineage counts workbooks that meet all these criteria:

- Has been indexed by Tableau Catalog.
- Connects to the data source and uses at least one field in the data source.
- Contains worksheets, including dashboards or stories that contain a worksheet, that use at least one field in the data source.

When metadata is blocked because of limited permissions, or the asset is in a Personal Space, Catalog still counts the workbook. But instead of seeing some of the sensitive metadata, you see Permissions required. For more information, see Access lineage information.

Use email to contact owners

At the end of the lineage is Owners. The list of owners includes anyone assigned as the owner or contact for any content downstream from the lineage anchor.

You can email owners to let them know about changes to the data. (To email owners, you must have the 'Overwrite' (Save) capability on the lineage anchor content.)

1. Select Owners to see the list of people who are impacted by the data in this lineage.
2. Select the owners you want to send a message to.
3. Click Send Email to open the email message box.
4. Enter the Subject and your message in the text box, and click Send.

Set a Data Quality Warning

Data quality warnings are a feature of Tableau Catalog. Starting in 2019.3, Tableau Catalog is available as part of the Data Management offering for Tableau Server and Tableau Online. When Tableau Catalog is enabled in your environment, you can set data quality warnings. For more information, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.

You can set a warning message on a data asset so that users of that data are aware of issues. For example, you might want to let users know that a data source has been deprec-
ated, or that a refresh has failed for an extract data source, or that a table contains sensitive data.

About data quality warnings

There are two kinds of data quality warnings you can set. The first kind is visible to users until you remove it. The second kind is generated by Tableau when you set Tableau to monitor for refresh failures of extract data sources or flow run failures.

For extracts and flows, you can set one data quality warning of each kind per asset.

For databases, tables, virtual connections, virtual connection tables, and live data sources, you can set only one quality warning.

When you set the first kind, it's visible to users until you remove it using the data quality dialog box. You can also use the dialog box to make any updates to the quality warning you set.
When you set Tableau to monitor for extract data source refresh failures or flow run failures, if a warning is generated, it’s visible to users until the extract refresh or flow run is successful. You can update or remove a warning by opening and editing the contents in the dialog box.

**Note:** You can set both kinds of data quality warnings and enable high visibility using REST API. For more information, see Add Data Quality Warning in the Tableau REST API Help.

**Who can see the data quality warning**

In Tableau Server and Tableau Online, when you set a warning on a data source, database, table, virtual connection, or virtual connection table, the warning is visible to users of the asset and any assets downstream from it. For example, a warning set on a table is visible to users looking at a dashboard with an upstream dependency on that table - users see a warning icon on the dashboard's Data Details tab and can open the pane to see the details. Warnings are visible elsewhere in Tableau as described in Set high visibility for a data quality warning.
In Tableau Desktop, users see a warning icon (either a blue circle or a yellow triangle with an exclamation point) on the Data tab in a workbook sheet when either

- a warning is set on a data source used in the workbook, or
- there is a warning upstream from the data source used in the workbook

Note: Data quality warnings do not appear for virtual connections used in Tableau Desktop.

To see the details of the warning, hover over the warning icon with the cursor.
Data quality warnings in subscriptions

Administrators can turn on data quality warnings in email subscriptions so that when users subscribe to a view, for example, the email they get includes any data quality warnings associated with that view. Emails with data quality warnings contain:

- Links to relevant views or workbooks with their Data Details pane open.
- Links to relevant upstream assets, such as data sources, tables, or databases.

Administrators can turn on data quality warnings in email subscriptions by selecting the Data Quality Warnings in Subscriptions option on the Tableau Server or Tableau Online site settings page. For more information, see Data Quality Warnings in Subscriptions in the Site Settings Reference.

How to set a quality warning

There are several types of data quality warnings you can set on an asset:

- Warning
- Deprecated
- Stale data
- Under maintenance
- Sensitive data

In addition to showing the type of data quality warning, you can include an optional message with more details about the warning.

To set a data quality warning:

1. Select the More actions menu ( . . . ) next to the asset you want to create a warning for, and then select Quality Warning.
2. Select the Enable warning check box.
3. Select the Warning type from the drop-down list.
4. (Optional) Select the Enable high visibility check box.
5. Enter a message to display to users. You can format the text in a message with bold, underline, and italics, and include a link or an image. To see text formatting tips, click
the information (i) icon above the **Save** button.

6. Click **Save**.

---

**How to set a monitoring quality warning**

You can set Tableau to monitor for two events: extract data source refresh failure and flow run failure. When the event occurs, Tableau generates a quality warning that appears in the same places that a manual quality warning appears.

To set Tableau to monitor for either event:

1. Select the More actions menu (…) next to the extract data source or flow you want to create a warning for, and then select the appropriate option:
- Quality Warning > Extract Refresh Monitoring
- Quality Warning > Flow Run Monitoring

2. In the dialog box, select the monitoring check box.
3. (Optional) Select the Enable high visibility check box.
4. (Optional) Enter a message to display to users. You can format the text in a message with bold, underline, and italics, and include a link or an image. To see text formatting tips, click the information (i) icon above the Save button.
5. Click Save.

Set high visibility for a data quality warning

There are times when you want to make sure that users of a visualization know important information about the data they're viewing, whether it be that the data is stale, or that the source has been deprecated, or that the flow run has failed. You can do this by selecting the Enable high visibility check box in the Data Quality Warning dialog box, as described in step 4 of How to set a data quality warning.
When enabled, a notification appears when anyone opens a published view affected by this warning.

High visibility warnings are identified with a yellow warning symbol, which makes them more visible elsewhere in Tableau, as in these examples:

On the External Assets page:

On a database page:

On the Data Details pane:
On metrics. Warnings appear when you open a metric in Tableau Mobile, and in Tableau Server and Tableau Online when you hover over a metric in grid view and on the metric details page, as shown below:
You can change a high visibility warning to normal visibility by clearing the **Enable high visibility** check box in the Data Quality Warning dialog box.

## Remove a data quality warning

When a warning no longer applies, you can remove it by navigating to the data asset with the warning.

1. Select the More actions menu (…) next to the data asset and select **Quality Warning**.
2. Clear the **Enable warning** check box to remove the warning.
3. Click **Save**.

## Who can do this

To set a data quality warning, you must either

- be a server or site administrator, or
- have the Overwrite capability for the asset.
Manage Dashboard Extensions in Tableau Online

Dashboard extensions are web applications that run in custom dashboard zones and can interact with the rest of the dashboard using the Tableau Extensions API. Dashboard extensions give users the ability to interact with data from other applications directly in Tableau.

**Note:** You must be a site administrator to add extensions to the safe list and to control the type of data the extensions can access. The site administrator can also configure whether users on the site will see prompts when they add or view extensions in a dashboard. For information about extension security and recommended deployment options, see Extension Security - Best Practices for Deployment.

For information about using dashboard extensions in Tableau, see Use Dashboard Extensions.


Before you run extensions on Tableau Online

Tableau supports two types of dashboard extensions: Network-enabled extensions, which can be hosted on web servers located inside or outside of your local network and have full access to the web, and Sandboxed extensions, which run in a protected environment without access to any other resource or service on the web.

**Note:** Beginning in March 2021.1 Tableau supports integration with Einstein Discovery through the Einstein Discovery Dashboard extension. This is a special extension that has access to data in Salesforce.com and is allowed by default. It is not considered a
Network-enabled extension or a Sandboxed extension. For more information on Einstein Discovery integration, see Configure Einstein Discovery Integration.

Sandboxed extensions are hosted by Tableau and employ W3C standards, such as Content Security Policy (CSP), to ensure the extension can’t make network calls outside of the hosting Tableau Server. A Sandboxed extension can query data in the dashboard, but it can’t send that data anywhere outside of the sandbox. Sandboxed Extensions are supported in Tableau 2019.4 and later. By default, Sandboxed extensions are allowed to run if extensions are enabled for the site.

Network-enabled dashboard extensions are web applications and could be running on any computer set up as a web server. This includes local computers, computers in your domain, and third-party web sites. Because Network-enabled extensions could be hosted on third-party sites and could have access to the data in the dashboard, you want to only allow the extensions you trust. See Test Network-enabled extensions for security.

For security, you can use the settings for dashboard extensions on Tableau Online to control and limit the dashboard extensions that are allowed to run.

- By default, Sandboxed extensions are allowed to run if extensions are enabled for the site.
- By default, no Network-enabled extensions are allowed unless they have been explicitly added to the safe list.
- By default, only extensions that use the HTTPS protocol are allowed, which guarantees an encrypted channel for sending and receiving data (the only exception is for http://localhost).
- If the Network-enabled extension requires full data (access to the underlying data) the extension will not be able to run on Tableau Online unless you explicitly add the extension to the safe list and grant the extension access to full data.
Control dashboard extensions and access to data

Site administrators can control whether to enable extensions for the site and whether to allow Sandboxed extensions on the site. The default site settings allow Sandboxed extensions to run on the site, provided the extension is not specifically blocked on the server. The default site settings allow Network-enabled extensions to run that appear on the safe list for the site. Individual Sandboxed extensions can also be added to the safe list, if Sandboxed extensions are not allowed by default.

1. To change these settings for the site, go to **Settings > Extensions**.

2. Under Dashboard Extensions, configure these options:
   - Let users run extensions on this site
   - Let Sandboxed extensions run unless they are specifically blocked by a server administrator

Site administrators can add or remove Network-enabled and Sandboxed extensions from the safe list for a site. When you add an extension to the safe list, you can control whether to allow the extension to have access to full data. See Add extensions to the safe list and configure user prompts.

Identifying an extension

As a web application, an extension is associated with a URL. You use this URL to test and verify the extension. You also use the URL to add the extension to the safe list to allow full data access, or to the block list to prohibit any access.

If you have the extension manifest file (.trex), an XML file that defines properties for the extension, you can find the URL from the `<source-location>` element.

```xml
<source-location>
  <url>https://www.example.com/myExtension.html</url>
</source-location>
```
Tableau Online Help

If you have added the extension to the dashboard, you can find the URL from the extension properties. From the More Options menu, click About.

The About dialog box lists the name of the extension, the author of the extension, the website of the author, along with the URL of the extension.

Add extensions to the safe list and configure user prompts

To ensure that users can use Network-enabled extensions that are trusted, you can add them to the safe list for the site. You can also add Sandboxed extensions to the safe list, if Sandboxed extensions aren't enabled by default on the site.

On the safe list, you can control whether to grant the extension full data access. By default, when you add an extension to the safe list, the extension only has access to the summary (or
aggregated) data. You can also control whether users will see a prompt asking them to allow the extension access to data. You might want to add an extension to the safe list (for example, a Sandboxed extension) so that you can configure whether or not users see the prompts. When you hide the prompt from users, the extension can run immediately.

1. Go to **Settings > Extensions**.

2. Under **Enable Specific Extensions**, add the URL of the extension. See Identifying an extension.

3. Choose to **Allow** or **Deny** the extension **Full Data Access**.

Full data access is access to the underlying data in the view, not just the summary or aggregated data. Full data access also includes information about the data sources, such as the names of the connection, fields, and tables. In most cases, if you are adding an extension to the safe list so that it can run, you will also want to allow the extension to have access to full data, if the extension requires it. Before adding extensions to the safe list, be sure to Test Network-enabled extensions for security.

4. Choose to **Show** or **Hide** the **User Prompts**.

Users see the prompts by default when they are adding an extension to a dashboard, or when they are interacting with a view that has an extension. The prompt tells users details about the extension and whether the extension has access to full data. The prompt gives users the ability to allow or deny the extension from running. You can hide this prompt from users, allowing the extension to run immediately.

**Test Network-enabled extensions for security**

Dashboard extensions are web applications that interact with data in Tableau using the Extensions API. Network-enabled dashboard extensions could be hosted on web servers inside or outside of your domain, and can make network calls and have access to resources on the Internet. Because of this and the potential vulnerabilities, such as cross-site scripting, you should test and vet Network-enabled dashboard extensions before users use them in dashboards on Tableau Desktop, and before you allow the extensions on Tableau Online.
Examine the source files

Dashboard extensions are web applications and include various HTML, CSS, and JavaScript files, and an XML manifest file (*.trex) that defines the properties in the extension. In many cases, the code for a dashboard extension is publicly available on GitHub and can be examined there or downloaded. In the manifest file (*.trex), you can find the source location, or URL indicated where the extension is hosted, the name of the author, and the website of the author or company to contact for support. The `<source-location>` element specifies in the URL, the `<author>` element, specifies the name of the organization and the website to contact for support (website="SUPPORT_URL"). The website is the Get Support link user see in the About dialog box for the extension.

Many dashboard extensions 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.

All extensions are required to use HTTPS protocol (https://) for hosting their extensions. You should examine the source files for the extension to ensure that any reference to external libraries is also using HTTPS or is hosted on the same website as the extension. The one exception to the requirement of HTTPS is if the extension is hosted on the same computer as Tableau (http://localhost).

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. In particular, check if any user-supplied data is validated to prevent cross-site scripting.

Understand data access

The Tableau Extensions API provides methods that can access the names of the active tables and fields in the data source, the summary descriptions of the data source connections, and the underlying data in a dashboard. If an extension uses any of these methods
in a view, the extension developer must declare that the extension requires full data permission in the manifest file (.trex). The declaration looks like the following.

```xml
<permissions>
  <permission>full data</permission>
</permissions>
```

Tableau uses this declaration to provide a prompt to users at run time that gives them the option of allowing this access or not. If the extension uses any one of these four methods, without declaring full-data permission in the manifest file, the extension will load but the method calls will fail.

For information about how an extension accesses data from the dashboard, and the JavaScript methods used, see Accessing Underlying Data in the Tableau Extensions API. To get a better understanding about what the extension can find out about the data, you can use the DataSources sample dashboard extension (available from the Tableau Extensions API GitHub repository) to see what data is exposed when the `getDatasourcesAsync()` method is called.

**Test the extension in an isolated environment**

If possible, test the dashboard extension in an environment that is isolated from your production environment and from user computers. For example, add a dashboard extensions to a safe list on a test computer or virtual machine that’s running a version of Tableau Online that is not used for production.

**Monitor traffic created by the dashboard extension**

When you test a Network-enabled dashboard extension, use a tool like Fiddler, Charles HTTP proxy, or Wireshark to examine the requests and responses that the extension makes. Make sure that you understand what content the extension is requesting. Examine the traffic to be sure that the extension is not reading data or code that is not directly related to the purpose of the extension.
Configure Connections with Analytics Extensions

Analytics extensions allow you to extend Tableau dynamic calculations in a workbook with languages like R and Python, with Einstein Discovery, and with other tools and platforms. These settings endpoints enable you to configure analytics extensions on your site in Tableau Online. For more information, see Analytics Extensions API.

For more information about user scenarios and configuring analytics connections in Tableau Desktop or for web authoring, see Pass Expressions with Analytics Extensions, in the Tableau Desktop and Web Authoring Help.

**Note:** Beginning in June 2021, you can create multiple analytics extensions connections for a site, including multiple connection for the same type of extension (you are presently limited to a single Einstein Discovery analytics extension for each site). For details, see What's New in Tableau Online.

This topic describes how to configure sites on Tableau Online with analytics extensions.

Security requirements and configuration

For increased security, Tableau Online requires an encrypted channel and authenticated access to the external services used for analytics extensions.

**Certificate**

The server running the external service for analytics extensions must be configured with a valid TLS/SSL certificate from a trusted 3rd party certificate authority (CA). Tableau Online will not establish a connection with external servers that are configured with a self-signed certificate, a certificate from a private PKI, or a certificate that is not trusted by an established 3rd party CA.
Safelist firewall configuration

Many organizations deploy a firewall that requires safelist exceptions for known hosts outside the network. In this scenario, you will need to specify two Tableau Online IP addresses as exceptions. The Tableau Online IP addresses used for connections to analytics extensions servers are 44.224.205.196 and 44.230.200.109.

Configure analytics extensions settings

1. Sign in to Tableau Online as a site administrator.
2. Click Settings.
3. On the Settings page, click the Extensions tab and then scroll to Analytics Extensions.
4. Select Enable analytics extensions for site.
5. Click Create new connection.
6. In the New Connection dialog, click the connection type you want to add, then enter the configuration settings for your analytics service:
3. The options you need to configure depend on the connection type you choose:

- For an Einstein Discovery connection, click Enable.
- For TabPy, RServer and Analytics Extensions API connections, enter the following information:
  - **Connection Name**: (Required) Specify the server type you are connecting to. RSERVER supports connections to R using the RServer package. TABPY supports connections to Python using TabPy, or to other analytics extensions.
  - **Require SSL** (Recommended): Select this option to encrypt the connection to the analytics service. If you specify a HTTPS URL in the Hostname field, then you must select this option.
  - **Hostname**: (Required) Specify the computer name or URL where the analytics service is running. This field is case sensitive.
- **Port**: (Required) Specify the port for the service.
- **Sign in with a username and password**: (Recommended) Select this option to specify user name and password that is used to authenticate to the analytics service.

7. Click **Save**.

**Edit or delete an analytics extension connection**

To edit or delete a configuration, navigate to **Analytics Extensions** on the **Extensions** tab of your site.

Click the **Edit** or **Delete** icon and follow the prompts to change the configuration.

**Script errors**

Tableau cannot verify that workbooks that use an analytics extension will render properly on Tableau Online. There might be scenarios where a required statistical library is available on a user’s computer but not on the analytics extension instance that Tableau Online is using.

A warning will be displayed when you publish a workbook if it contains views that use an analytics extension.

This worksheet contains external service scripts, which cannot be viewed on the target platform until the administrator configures an external service connection.
Configure Einstein Discovery Integration

Beginning March, 2021, Tableau Online supports integration with Einstein Discovery, making Einstein Discovery predictions available to authors and viewers of dashboards. Starting in version 2021.2.0, Einstein Discovery predictions is also now available when authoring flows on the web.

Einstein Discovery in Tableau is powered by salesforce.com. Consult your agreement with salesforce.com for applicable terms.

For details on how to use Einstein Discovery predictions in Tableau, including licensing and permission requirements, see Integrate Einstein Discovery Predictions in Tableau in the Tableau Desktop and Web Authoring Help. For information about adding predictions in flows, see Add Einstein Discovery Predictions to your flow.

Einstein Discovery dashboard extension

The Einstein Discovery dashboard extension allow workbook authors to surface real-time predictions in Tableau. The dashboard extension delivers predictions interactively, on-demand, using source data in a Tableau workbook and an Einstein Discovery-powered model deployed in Salesforce.

By default Tableau Online site configuration allows saved OAuth access tokens, so the only step necessary is to configure Cross-Origin Resource Sharing (CORS) in the Salesforce org that hosts Einstein Discovery. This requires permissions in the Salesforce org. For details on necessary licenses and permissions, see Requirements for access - Einstein Discovery. For details on configuring CORS in Salesforce, see Configure CORS in Salesforce.com for Einstein Discover Integration in Tableau Online.

Einstein Discovery analytics extension

The Einstein Discovery analytics extension gives your users the ability to embed predictions directly in Tableau calculated fields. A table calc script requests predictions from a model
deployed in Salesforce by passing its associated prediction ID and input data that the model requires. Use Model Manager in Salesforce to auto-generate a Tableau table calculation script, and then paste that script into a calculated field for use in a Tableau workbook.

By default Tableau Online site configuration allows saved OAuth access tokens, so the only step necessary is to configure Cross-Origin Resource Sharing (CORS) in the Salesforce org that hosts Einstein Discovery. This requires administrator permissions in the Salesforce org. For details, see Configure CORS in Salesforce.com for Einstein Discover Integration in Tableau Online.

Einstein Discovery Tableau Prep extension

Supported in Tableau Server and Tableau Online starting in version 2021.2.0

The Einstein Discovery Tableau Prep extension enables users to embed Einstein predictions directly in their flows when authoring flows on the web.

By default, Tableau Online site configuration allows saved OAuth access tokens, so the only step necessary is to enable Tableau Prep Extensions for the server. This requires administrator permissions in the Salesforce org. For details, see Enable Tableau Prep Extensions.

Configure CORS in Salesforce.com for Einstein Discover Integration in Tableau Online

In version 2021.1.0 the ability to integrate Einstein Discovery predictions into Tableau Dashboards was added. You can do this using the Einstein Discovery dashboard extension. A prerequisite for this is configuring Cross-Origin Resource Sharing (CORS) in the Salesforce org that hosts Tableau CRM and includes the model and predictions that are going to be used.
This procedure explains how an administrator in a Salesforce.com organization would do this configuration. You can find more information about CORS in the Salesforce documentation, Set Up Cross-Origin Resource Sharing (CORS).

Configure CORS for Einstein Discovery.

**Note:** This procedure documents the process in Salesforce Lightning. If you are using the traditional interface, the navigation may be different but the configuration is the same.

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, search for "cors" and select **CORS**.

3. In **CORS**, in the **Allowed Origins List** section, click **New**.
4. In **CORS Allowed Origin List Edit**, enter the URL of Tableau Online, beginning with "https://".

For more information about the URL pattern, see the Salesforce developer documentation: [https://developer.salesforce.com/docs/atlas.en-us.chat-terapi.meta/chatterapi/extend_code_cors.htm](https://developer.salesforce.com/docs/atlas.en-us.chat-terapi.meta/chatterapi/extend_code_cors.htm)

5. Click **Save**.

**Integrate Tableau with a Slack workspace**

Beginning with version 2021.3, Tableau Server and Tableau Online support integration with Slack, making Tableau notifications available to licensed Tableau users in their Slack workspace.
The Tableau for Slack integration lets you connect your Tableau site with a Slack workspace. Once it’s enabled, Tableau users can see notifications in Slack when teammates share content with them, when they’re mentioned in a comment, or when data meets a specified threshold in a data-driven alert. If a site administrator in Tableau Online or a server administrator in Tableau Server enables notifications on a site, users can control which notifications they receive in Slack by configuring their Account Settings. For more information, see See Tableau notifications in Slack.

To integrate Slack with your Tableau site, there are a few necessary configuration steps, including some in your Tableau site, and some in the Slack workspace you want to connect. This overview outlines these steps for both Tableau site administrators on Tableau Online or a Tableau Server Administrator on Tableau Server, and Slack workspace administrators.

Requirements

Enabling Tableau in Slack requires both a Slack workspace administrator and either a Tableau site administrator in Tableau Online, or a Tableau server administrator in Tableau Server.

Connect a Tableau Online site to a Slack workspace

Tableau Online site administrators can connect one or more Tableau Online site to a Slack workspace. Connecting consists of these tasks:

- **Tableau site administrator**: Request permission to the Slack workspace through Tableau's site settings.
- **Slack workspace administrator**: Add the Tableau app to a Slack workspace by approving a request from the Tableau administrator for permission to access the Slack workspace.
- **Tableau administrator**: connect your Tableau site to Slack.

Step 1: Request permission to the Slack workspace

**Tableau site administrator**
1. Sign in to the site you’d like to connect to Slack. On the Settings page of your site, select the **Integrations** tab.

2. Under Slack Connectivity, select **Connect to Slack**.
   Follow the prompt to sign in to your Slack workspace.

3. Request to install the Tableau app in Slack. This request goes to the Slack workspace administrator. You can add a message to the workspace administrator, if needed.

4. Select **Submit**.
   
   The Slack administrator will receive a notification for the request. For more information about this process, see An Admin's Guide to Slack Management in Slack's documentation.

   Slackbot (Slack’s notifications center) will notify you when your request is approved.

**Step 2: Add the Tableau app to the Slack workspace**

**Slack workspace administrator**

Approve the request from the Tableau site administrator in **Manage Apps** to add the Tableau app to the Slack workspace.

For more information, see An Admin's Guide to Slack Management in Slack's documentation.

**Step 3: Connect your Tableau site to Slack**

**Tableau site administrator**

Once the Slack workspace administrator approves the Tableau application, a Tableau administrator can finalize the app's connection to a Tableau site.

1. On the Settings page of your site, select the **Integrations** tab.

2. Under Slack Connectivity, select **Connect to Slack**.
3. Follow the prompt to sign in to your Slack workspace.
4. Select **Allow** to give your Tableau site access to the Slack workspace.

The Tableau site and Slack workspace are now connected.

**Disconnect a Tableau Server site from Slack**

You can disconnect a Tableau site from a Slack workspace by selecting **Disconnect from Slack** in the Integrations tab of site settings. Users will continue to receive notifications for some time. The OAuth client information you added in Step 2 is retained and can be used to connect to a new workspace, if needed.

**Update your Tableau Slack application**

When a new version of the Tableau Slack application is available, Tableau recommends reinstalling the application to maintain app performance and use new features.

To reinstall the Tableau for Slack app, select **Disconnect** from Slack in the Integrations tab of your site settings, then go through the connection steps in Connect a Tableau Online site to a Slack workspace.

**Automate Tasks Using tabcmd**

**tabcmd**

**Note:** The tabcmd command-line utility version 2.0 is available at [Tableau tabcmd](#) (new window). This new version allows you to run tabcmd commands on MacOS and authenticate using personal access tokens, which allows you to be multi-factor authentication compliant. Version 2.0 is built on public endpoints available in the Python-based Tableau Server Client (TSC). This latest version works for both Tableau Online and Tableau Server.

Tableau provides the tabcmd command-line utility which you can use to automate site administration tasks on your Tableau Online site. For example, creating or deleting users, projects, and groups.
Install tabcmd

Note: These instructions are for installing the tabcmd 1.0 command-line utility. To install the tabcmd 2.0 command-line utility, go to Tableau tabcmd (new window).

When Tableau Server or Tableau Online is upgraded to a new version, if an updated version of tabcmd is required, you can download it from the Tableau Server Releases page on the Tableau website.

For Tableau Server, we recommend you download the version that matches your server version. For Tableau Online, we recommend you always download the latest version to avoid issues caused by version incompatibilities. In either case, using an out of date version of tabcmd can cause errors and unpredictable results.

1. Open a web browser and go to the Tableau Server Releases page. Go to this page even if you use Tableau Online.

2. If you’re using:
   - Tableau Online, select the latest Tableau Server release.
   - Tableau Server (Windows or Linux): select the release that matches your server version.

   In either case, if the expanded information shows maintenance releases, select the latest maintenance release or the one that matches your server version.
This takes you to the release notes page, called Resolved Issues, where you can read about security improvements and resolved issues.

3. Scroll to the **Download Files** section under the resolved issues, select the tabcmd download link that is compatible with the computer on which you’ll run the tabcmd commands.

### Download Files

**Windows**
- TableauServerTabcmd-64bit-2020-1.exe (93 MB)
- TableauServer-64bit-2020-1.3.exe (1.14 MB)

**Linux**
- tableau-tabcmd-2020-1-1200arch.rpm (10 MB)
- tableau-tabcmd-2020-1-3_all.deb (10 MB)
- tableau-server-2020-1-3x86_64.rpm (1647 MB)
- tableau-server-2020-1-3_amd64.deb (1649 MB)

The remaining steps refer to this computer as “the tabcmd computer.”

4. Save the installer to the tabcmd computer, or a location accessible from that computer.

5. Complete the installation steps as appropriate for the operating system of the tabcmd computer:
Windows

By default tabcmd is installed to **C:\Program Files\Tableau\Tableau Server\<version>\extras\Command Line Utility.** You can change this during installation and recommend that you install tabcmd to a folder named `tabcmd` at the root of the C:\ drive (C:\tabcmd). This can make it easier to locate and run, and will accommodate some limitations with the Windows operating system if you add the tabcmd directory to the Windows PATH.

**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.

You can install tabcmd in two ways on Windows:

- Double-click the installer to follow the steps in the UI:
  
  a. Accept the license agreement.
  
  b. If you want to install to a non-default location, click **Customize** and type or browse to the location you want to install tabcmd to.
  
  c. Click **Install**.

    If you are prompted by Windows Defender Firewall or User Account Control, click **Allow access**.

- Run the installer from a command prompt:
  
  a. Open a command prompt as administrator on the tabcmd computer.
b. Navigate to the directory where you copied the tabcmd installer.

c. Install tabcmd:

```
    tableau-setup-tabcmd-tableau-<version_code>-x64.exe /quiet ACCEPTEULA=1
```

To install to a non-default location:

```
    tableau-setup-tabcmd-tableau-<version_code>-x64.exe /quiet ACCEPTEULA=1 INSTALLDIR-R="<path\to\install\directory>"
```

For example:

```
    tableau-setup-tabcmd-tableau-<version_code>-x64.exe /quiet ACCEPTEULA=1 INSTALLDIR-R="C:\tabcmd"
```

For a complete list of command line options you can use with the tabcmd installer, run the installer with a /?. For more information on tabcmd installer command line options, see Install Switches and Properties for tabcmd (Windows).

The tabcmd Setup program creates logs in C:\Users\<user>\AppData\Local\Temp you can use if you have problems installing tabcmd. The logs use the naming convention Tableau_Server_Command_Line_Utility_(<version_code>)_############################-.log.

- **Linux**

  **Note:** To run tabcmd on a Linux computer, you must have Java 11 installed. On RHEL-like systems, this will be installed as a dependency.
when you install tabcmd. On Ubuntu systems, you need to install Java 11 separately if it is not already installed.

As of July 2022, Debian distributions are no longer supported. For more information, see this Tableau Community post.

a. Log on as a user with sudo access to the tabcmd computer.

b. Navigate to the directory where you copied the .rpm or .deb package that you downloaded.

   - On RHEL-like distributions, including CentOS, run the following command:

     ```bash
     sudo yum install tableau-tabcmd-<version>.noarch.rpm
     ```

   - On Ubuntu, run the following command:

     ```bash
     sudo apt-get install ./tableau-tabcmd-<version>_<all.deb
     ```

To uninstall tabcmd from a Linux computer, see the documentation for the Linux variety you are running.

6. (Optional) Add the fully qualified location where tabcmd is installed to your system path to allow you to run tabcmd commands without changing to that location, or specifying the location with each command. Steps to do this depend on the type and version of your operating system. For more information, see PATH_(variable).

How to use tabcmd

The basic steps for using tabcmd are as follows:
1. Open the Command Prompt as an administrator.

2. On a Windows computer, if you installed tabcmd on a computer other than the initial node, change to the directory where you installed tabcmd.

   On a Linux computer, you do not need to change to the install directory.

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.

**Important:** If you are using tabcmd to perform more than one task, you must run tasks one after another (serially), rather than at the same time (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:

```plaintext
tabcmd login -s https://online.tableau.com -t mysite -u authority@email.com -p password
```

Here’s how to start a session and delete a workbook with one command—note that you do not need `login` here:

```plaintext
tabcmd delete "Sales_Workbook" -s https://online.tableau.com -t campaign -u admin@email.com -p password
```

The options `-s, -t, -u, and -p` are among the tabcmd global variables, which can be used with any command.
For more information, see tabcmd Commands.

**tabcmd Commands**

**Note:** The tabcmd command-line utility version 2.0 is available at [Tableau tabcmd](new_window). This new version allows you to run tabcmd commands on MacOS and authenticate using personal access tokens, which allows you to be multi-factor authentication compliant. Version 2.0 is built on public endpoints available in the Python-based Tableau Server Client (TSC). This latest version works for both Tableau Online and Tableau Server.

You can use the following commands with the tabcmd command line tool in Tableau Online:

- login
- logout
- get url
- addusers (to group)
- creategroup
- deletegroup
- export
- createproject
- deleteproject
- publish
- createextracts
- refreshextracts
addusers group-name

Adds users to the specified group.

Example

tabcmd addusers "Development" --users "users.csv"

Options

--users

Add the users in the given .csv 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 created on Tableau Online.

For more information, see CSV Import File Guidelines.

--[no-]complete

When set to complete this option requires that all rows be valid for any change to succeed. If not specified, --complete is used.
Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID,
surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

createextracts

Creates extracts for a published workbook or data source.
Options

-d, --datasource

The name of the target data source for extract creation.

--embedded.datasources

A space-separated list of embedded data source names within the target workbook. Enclose data source names with double quotes if they contain spaces. Only available when creating extracts for a workbook.

--encrypt

Create encrypted extract.

--include-all

Include all embedded data sources within target workbook. Only available when creating extracts for workbook.

--parent-project-path

Path of the project that is the parent of the project that contains the target resource. Must specify the project name with --project.

--project

The name of the project that contains the target resource. Only necessary if --workbook or --datasource is specified. If unspecified, the default project 'Default' is used.

-u, -url

The canonical name for the resource as it appears in the URL.

-w, -workbook
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The name of the target workbook for extract creation.

Global options

The following options are used by all `tabcmd` 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.

-h, --help

Displays the help for the command.

**Note:** Some commands listed may not apply when using `tabcmd` with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given `.txt` file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID,
surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

```
--no-prompt
```

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

```
--[no-]cookie
```

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.

```
--timeout
```

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

```
-
```

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

```
creategroup group-name
```

Creates a group. Use addusers to add users after the group has been created.

```
Example
```

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tabcmd creategroup "Development"

Global options

The following options are used by all `tabcmd` 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.

-h, --help

Displays the help for the command.

**Note:** Some commands listed may not apply when using `tabcmd` with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given `.txt` file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID,
surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

createproject project-name

Creates a project.

Example
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tabcmd createproject -n "Quarterly_Reports" -d "Workbooks showing quarterly sales reports."

Options

-n, --name

Specifies the name of the project that you want to create.

--parent-project-path

Specifies the name of the parent project for the nested project as specified with the -n option. For example, to specify a project called "Nested" that exists in a "Main" project, use the following syntax: --parent-project-path "Main" -n "Nested".

-d, --description

Specifies a description for the project.

Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.
-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the
command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

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, license type, 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 administrator level and publisher permissions in the CSV file, you can pass access level information by including the --role option and specifying the site role you want to assign users listed in the CSV file.

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.)

Example

```
tabcmd createsiteusers "users.csv" --role "Explorer"
```
Options

--admin-type

   Deprecated. Use the --role option instead.

--auth-type

   Sets the authentication type (TableauID or SAML) for all users in the .csv file. If unspecified, the default is TableauID.

   **Note:** To use SAML authentication, the site itself must be SAML-enabled as well. For information, see Enable SAML Authentication on a Site.

--[no-]complete

   Deprecated. Default error behavior: if there are more than 3 errors within a ten-row span, then the command will fail.

--no-publisher

   Deprecated. Use the --role option instead.

--nowait

   Do not wait for asynchronous jobs to complete.

--publisher

   Deprecated. Use the --role option instead.

--role

   Specifies a site role for all users in the .csv file. When you want to assign site roles using the --role option, create a separate CSV file for each site role.
Valid values are: ServerAdministrator, SiteAdministratorCreator, SiteAdministratorExplorer, SiteAdministrator, Creator, ExplorerCanPublish, Publisher, Explorer, Interactor, Viewer, and Unlicensed.

The default is Unlicensed for new users and unchanged for existing users. Users are added as unlicensed also if you have a user-based server installation, and if the createsiteusers command creates a new user, but you have already reached the limit on the number of licenses for your users.

Note: On a multi-site Tableau Server, if you want to assign the Server-Administrator site role using the --role option, use the createusers command instead of createsiteusers.

--silent-progress

Do not display progress messages for the command.

Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.
The Tableau Online username, which is required at least once to begin session.

The Tableau Online password, which is required at least once to begin session.

Allows the password to be stored in the given .txt file rather than the command line for increased security.

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

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.

Waits the specified number of seconds for the server to complete processing the
command. By default, the process will wait until the server responds.

"--"

Specifies the end of options on the command line. You can use "--" to indicate to 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 tabcmd command, where "-430105/Sheet1" is a required value for the export command.

tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1

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"

Options

-"r, "--project

The name of the project containing the workbook or data source you want to delete. If not specified, the "Default" project is assumed.

-"parent-project-path

Specifies the name of the parent project for the nested project as specified with the "-r" option. For example, to specify a project called "Nested" that exists in a "Main" project, use the following syntax: "--parent-project-path "Main" -r "Nested"."
--workbook

The name of the workbook you want to delete.

--datasource

The name of the data source you want to delete.

Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file
Tableau Online Help

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/SHEET1 is a required value for the export command.
tabcmd export --csv -f "D:\export10.csv" -- -430105/SHEET1

delete extracts

Deletes extracts for a published workbook or data source.

Options

-d, --datasource

The name of the target data source for extract deletion.

--embedded-datasources

A space-separated list of embedded data source names within the target workbook. Enclose data source names with double quotes if they contain spaces. Only available when deleting extracts for a workbook.

--encrypt

Create encrypted extract.

--include-all

Include all embedded data sources within target workbook.

--parent-project-path

Path of the project that is the parent of the project that contains the target resource. Must specify the project name with --project.

--project

The name of the project that contains the target resource. Only necessary if --workbook or --datasource is specified. If unspecified, the default project 'Default' is used.
Tableau Online Help

- `u, -url`
  
The canonical name for the resource as it appears in the URL.

- `w, -workbook`
  
The name of the target workbook for extract deletion.

Global options

The following options are used by all `tabcmd` 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.

- `h, --help`
  
  Displays the help for the command.

  **Note**: Some commands listed may not apply when using `tabcmd` with Tableau Online.

- `s, --server`
  
The Tableau Online URL, which is required at least once to begin session.

- `u, --user`
  
The Tableau Online username, which is required at least once to begin session.

- `p, --password`
  
The Tableau Online password, which is required at least once to begin session.

- `--password-file`
Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site
Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt
When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie
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.

--timeout
Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--
Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.
Tableau Online Help

    tabcmd export --csv -f "D:\export10.csv" -- -430105/S

**deletegroup** *group-name*

Deletes the specified group from the server.

**Example**

    tabcmd deletegroup "Development"

**Global options**

The following options are used by all *tabcmd* 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.

-h, --help

Displays the help for the command.

**Note:** Some commands listed may not apply when using *tabcmd* with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.
--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 `tabcmd` command, where `-430105/Sheet1` is a required value for the `export` command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

deleteproject `project-name`

Deletes the specified project from the server.

Using `tabcmd`, you can specify only a top-level project in a project hierarchy. To automate tasks you want to perform on a project within a parent project, use the equivalent Tableau REST API call.

**Example**

```
tabcmd deleteproject "Designs"
```

**Option**

```
--parent-project-path
```

Specifies the name of the parent project for the nested project as specified with the command. For example, to specify a project called "Designs" that exists in a "Main" project, use the following syntax: `--parent-project-path "Main" "Designs"`.

**Global options**

The following options are used by all `tabcmd` 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.

```
-h, --help
```

Displays the help for the command.
Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1

deletesiteusers filename.csv

Removes users from 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 site 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.

Example
tabcmd deletesiteusers "users.csv"

Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID,
surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/SHEET1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/SHEET1
```

export

Exports a view or workbook from Tableau Online and saves it to a file. This command can also export just the data used for a view. View data is exported at the summary level. To
export detail-level data, you must use the Tableau Server UI. For details, see Download Views and Workbooks.

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 "workbook/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 `Regional/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 `Regional/GlobalTemperatures`.

- To export a workbook, it must have been published with **Show Sheets as Tabs** selected in the Tableau Desktop Publish dialog box.

  **Note:** The Tableau workbook that contains the *admin views* cannot be exported.

- To filter the data you download, add a parameter filter using this format:

  ```
  ?<filter_name>=value
  ```

  or, if filtering on a parameter and that parameter has a display name that matches the name of a measure or dimension:

  ```
  ?Parameters.<filter_name>=value
  ```

- **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 and non-standard 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, or a non-standard ASCII character set, you need to URL encode (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
```
Tableau Online Help

tabcmd export "Sales/Sales_Analysis" --fullpdf --pagesize tabloid -f "C:\Tableau_Workbooks\Weekly-Reports.pdf"

Options

-f, --filename

Saves the file with the given filename and extension.

--csv

View only. Export the view's data (summary data) in .csv format.

--pdf

View only. Export as a PDF.

--png

View only. Export as an image in .png format.

--fullpdf

Workbook only. Export as a PDF. The workbook must have been published with Show Sheets as Tabs enabled.

--pagelayout

Sets the page orientation (landscape or portrait) of the exported PDF. If not specified, its Tableau Desktop setting will be used.

--pagesize

Sets the page size of the exported PDF as one of the following: unspecified, letter, legal, note folio, tabloid, ledger, statement, executive, a3, a4, a5,
b4, b5, or quarto. Default is letter.

--width
Sets the width in pixels. Default is 800 px.

--height
Sets the height in pixels. Default is 600 px.

Global options

The following options are used by all tabcmd 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.

-h, --help
Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server
The Tableau Online URL, which is required at least once to begin session.

-u, --user
The Tableau Online username, which is required at least once to begin session.

-p, --password
The Tableau Online password, which is required at least once to begin session.
Tableau Online Help

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 `tabcmd` command, where `-430105/SHEET1` is a required value for the `export` command.

`tabcmd export --csv -f "D:\export10.csv" -- -430105/SHEET1`  

**get url**

Gets the resource from Tableau Online 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_Works
dooks\Weekly-Reports.twb"`

**Global options**

The following options are used by all `tabcmd` 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.

-h, --help

Displays the help for the command.

**Note:** Some commands listed may not apply when using `tabcmd` with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.
The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to
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 tabcmd command, where -430105/SHEET1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/SHEET1
```

login

Logs in a Tableau Online 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 your site is configured to use SAML. To log in, you must pass the username and password of a user who has been created in your site. You will have the permissions of the Tableau Server user that you’re signed in as.

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**
**Tableau Online Help**

Log in to the Tableau Online site with the specified site ID:

```
tabcmd login -s https://online.tableau.com -t siteID -u user-@email.com -p password
```

**Options**

- **-s, --server**
  
  If you are running the command from a Tableau Server computer that's on your network, you can use `http://localhost`. Otherwise, specify the computer's URL, such as `http://bigbox.myco.com` or `http://bigbox`.

  If the server is using SSL, you will need to specify `https://` in the computer's URL.

  For Tableau Online, specify the URL `https://online.tableau.com`.

- **-t, --site**
  
  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 site ID of `west-coast-sales`.

- **-u, --username**
  
  The user name of the user logging in. For Tableau Online, the user name is the user's email address.

- **-p, --password**
  
  Password for the user specified for `--username`. If you do not provide a password you will be prompted for one.

- **--password-file**
  
  Allows the password to be stored in the given `filename.txt` file rather than the
command line, for increased security.

-x, --proxy

Use to specify the HTTP proxy server and port (Host:Port) for the tabcmd request.

--no-prompt

Do not prompt for a password. If no password is specified, the login command will fail.

--cookie

Saves the session ID on login. Subsequent commands will not require a login. This value is the default for the command.

--no-cookie

Do not save the session ID information after a successful login. Subsequent commands will require a login.

--timeout SECONDS

The number of seconds the server should wait before processing the login command. Default: 30 seconds.

Global options

The following options are used by all tabcmd 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.
Tableau Online Help

-h, --help

Displays the help for the command.

**Note:** Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.
[--no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where --430105/SHEET1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" --430105/SHEET1
```

logout

Logs out of the server.

Example

tabcmd logout

publish `filename.twb(x), filename.tds(x), or filename.hyper`

Publishes the specified workbook (.twb(x)), data source (.tds(x)), or extract (.hyper) to Tableau Online.

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_sfddc.hyper" -n "Sales Analysis" --oauth-username "user-name" --save-oauth
```

If the file is not in the same directory as tabcmd, include the full path to the file.

**Example**

```
tabcmd publish "\computer\volume\Tableau Workbooks\analysis_sfddc.hyper" -n "Sales Analysis" --oauth-username "username" --save-oauth
```

**Options**

- `-n, --name`

  Name of the workbook or data source on the server. If omitted, the workbook, data source, or data extract will be named after filename.

- `-o, --overwrite`

  Overwrites the workbook, data source, or data extract if it already exists on the server.

- `-r, --project`

  Publishes the workbook, data source, or data extract into the specified project. Publishes to the “Default” project if not specified.

- `--parent-project-path`
Specifies the name of the parent project for the nested project as specified with the \(-r\) option. For example, to specify a project called "Nested" that exists in a "Main" project, use the following syntax: \(--\text{parent-project-path} \ "Main" \ -r \ "Nested"\).

\(--\text{db-username}\)

Use this option to publish a database user name with the workbook, data source, or data extract.

If you connect to the data through a protected OAuth connection and access token, use the \(--\text{oauth-username}\) option instead.

\(--\text{db-password}\)

Use this option to publish a database password with the workbook, data source, or extract.

\(--\text{save-db-password}\)

Stores the provided database password on the server.

\(--\text{oauth-username}\)

The email address of the user account. Connects the user through a preconfigured OAuth connection, if the user already has a saved access token for the cloud data source specified in \(--\text{name}\). Access tokens are managed in user preferences.

For existing OAuth connections to the data source, use this option instead of \(--\text{db-username}\) and \(--\text{db-password}\).

\(--\text{save-oauth}\)

Saves the credential specified by \(--\text{oauth-username}\) 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 --oauth-username. This is analogous to using --save-db-password with a traditional database connection.

```
--thumbnail-username
```

If the workbook contains user filters, the thumbnails will be generated based on what the specified user can see. Cannot be specified when --thumbnail-group option is set.

```
--thumbnail-group
```

If the workbook contains user filters, the thumbnails will be generated based on what the specified group can see. Cannot be specified when --thumbnail-username option is set.

```
--tabbed
```

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.

```
--append
```

Append the extract file to the existing data source.

```
--replace
```

Use the extract file to replace the existing data source.

```
--disable-uploader
```

Disable the incremental file uploader.

`--restart`

Restart the file upload.

Global options

The following options are used by all `tabcmd` 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.

`-h`, `--help`

Displays the help for the command.

**Note:** Some commands listed may not apply when using `tabcmd` with Tableau Online.

`-s`, `--server`

The Tableau Online URL, which is required at least once to begin session.

`-u`, `--user`

The Tableau Online username, which is required at least once to begin session.

`-p`, `--password`

The Tableau Online password, which is required at least once to begin session.

`--password-file`

Allows the password to be stored in the given `.txt` file rather than the command line.
for increased security.

\texttt{-t, --site}

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

\texttt{--no-prompt}

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

\texttt{--[no-]cookie}

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.

\texttt{--timeout}

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

\texttt{--}

Specifies the end of options on the command line. You can use \texttt{--} to indicate to \texttt{tabcmd} that anything that follows \texttt{--} 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 \texttt{--} in a \texttt{tabcmd} command, where \texttt{-430105/Sheet1} is a required value for the \texttt{export} command.

\texttt{tabcmd export \texttt{--csv} -f "D:\export10.csv" \texttt{--} -430105/Sheet1}
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.

**Notes:**

- This method will fail and result in an error if your Server Administrator has disabled the RunNow setting for the site. For more information, see Tableau Server Settings.
- You can use tabcmd to refresh supported data sources that are hosted in the cloud. For example, SQL Server, MySQL, PostgreSQL on a cloud platform; Google Analytics; and so on.
- To refresh on-premises data with tabcmd, the data source must be a type that can be configured for Tableau Bridge Recommended schedules. For all other data sources that connect to on-premises data, you can use Bridge or the command-line data extract utility. Learn more at Use Bridge to Keep Data Fresh and Automate Extract Refresh Tasks from the Command Line.

**Examples**

```
tabcmd refreshextracts --datasource sales_ds
```

```
tabcmd refreshextracts --project "Sales External" --datasource sales_ds
```

```
tabcmd refreshextracts --project "Sales External" --parent-project-path "Main" --project "Sales External" --datasource sales_ds
```

```
tabcmd refreshextracts --workbook "My Workbook"
```

```
tabcmd refreshextracts --url SalesAnalysis
```

```
tabcmd refreshextracts --workbook "My Workbook" --
```
addcalculations

tabcmd refreshextracts --datasource sales_ds --remove-calculations

Options

--incremental

Runs the incremental refresh operation.

--synchronous

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.

--workbook

The name of the workbook containing extracts to refresh. If the workbook has spaces in its name, enclose it in quotes.

--datasource

The name of the data source containing extracts to refresh.

--project

Use with --workbook or --datasource to identify a workbook or data source in a project other than Default. If not specified, the Default project is assumed.
--parent-project-path

Specifies the name of the parent project for the nested project as specified with the --project option.

For example:

- To specify a project called "Nested" that exists in a "Main" project, use the following syntax:
  
  --parent-project-path "Main" --project "Nested"

- To specify a project called "Nested2" that is nested within the "Nested" project:
  
  --parent-project-path "Main/Nested" --project "Nested2"

--url

The name of the workbook as it appears in the URL. A workbook published as “Sales Analysis” has a URL name of “SalesAnalysis”.

--addcalculations

Use with --workbook to materialize calculations in the embedded extract of the workbook or --datasource to materialize calculations in the extract data source. Adds the operation to the queue used by the Backgrounder process. If a Backgrounder process is available, the operation runs immediately. This operation appears on the Background Tasks for Extracts administrative view.

--removecalculations

Use with --workbook or --datasource to remove calculations that were previously materialized. Adds the operation to the queue used by the Backgrounder process. If a Backgrounder process is available, the operation runs immediately. This operation appears on the Background Tasks for Extracts administrative view.
Tableau Online Help

Global options

The following options are used by all *tabcmd* 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.

*--help*

Displays the help for the command.

**Note:** Some commands listed may not apply when using *tabcmd* with Tableau Online.

*--server*

The Tableau Online URL, which is required at least once to begin session.

*--user*

The Tableau Online username, which is required at least once to begin session.

*--password*

The Tableau Online password, which is required at least once to begin session.

*--password-file*

Allows the password to be stored in the given .txt file rather than the command line for increased security.

*--site*

Indicates that the command applies to the site specified by the Tableau Online site ID,
surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Series1 is a required value for the export command.

tabcmd export --csv -f "D:\export10.csv" -- -430105/Series1

removeusers group-name

Removes users from the specified group.

Example
Tableau Online Help

tabcmd removeusers "Development" --users "users.csv"

Options

--users

Remove the users in the given .csv file from the specified group. The file should be a simple list with one user name per line.

--[no-]complete

Requires that all rows be valid for any change to succeed. If not specified --complete is used.

Global options

The following options are used by all tabcmd 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.

-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.
-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to
Tableau Online Help

**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 tabcmd command, where `--430105/Series1` is a required value for the `export` command.

```bash

tabcmd export --csv -f "D:\export10.csv" --430105/Series1
```

**runschedule schedule-name**

Runs the tasks in the specified schedule for the site that you are currently logged into. You cannot run this for all sites using tabcmd. To run the tasks in the schedule for all sites, log into the web interface, from the Schedules page, select All Sites, and then do a Run Now on the schedule.

This command takes the name of the schedule as specified on the server.

This command is not available for Tableau Online.

**Note:** This method will fail and result in an error if your Server Administrator has disabled the RunNow setting for the site. For more information, see Tableau Server Settings.

**Example**

```bash

tabcmd runschedule "5AM Sales Refresh"
```

**Global options**

The following options are used by all `tabcmd` 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.
-h, --help

Displays the help for the command.

Note: Some commands listed may not apply when using tabcmd with Tableau Online.

-s, --server

The Tableau Online URL, which is required at least once to begin session.

-u, --user

The Tableau Online username, which is required at least once to begin session.

-p, --password

The Tableau Online password, which is required at least once to begin session.

--password-file

Allows the password to be stored in the given .txt file rather than the command line for increased security.

-t, --site

Indicates that the command applies to the site specified by the Tableau Online site ID, surrounded by single quotes or double quotes. Use this option if the user specified is associated with more than one site. Site ID is case-sensitive when using a cached authentication token. If you do not match case you may be prompted for a password even if the token is still valid.

--no-prompt

When specified, the command will not prompt for a password. If no valid password is provided the command will fail.
Tableau Online Help

--[no-]cookie

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.

--timeout

Waits the specified number of seconds for the server to complete processing the command. By default, the process will wait until the server responds.

--

Specifies the end of options on the command line. You can use -- to indicate to 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 tabcmd command, where -430105/Sheet1 is a required value for the export command.

```
tabcmd export --csv -f "D:\export10.csv" -- -430105/Sheet1
```

Install Switches and Properties for tabcmd (Windows)

**Note:** The tabcmd command-line utility version 2.0 is available at [Tableau tabcmd](https://www.tableau.com) (new window). This new version allows you to run tabcmd commands on MacOS and authenticate using personal access tokens, which allows you to be multi-factor authentication compliant. Version 2.0 is built on public endpoints available in the Python-based Tableau Server Client (TSC). This latest version works for both Tableau Online and Tableau Server.

You can use the following switches when installing the Tableau Server Command Line Utility (tabcmd) version 2019.4.0 or later from the command line on Windows.
**Note:** There are no equivalent switches for the Linux version of the tabcmd installer.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>/install</td>
<td>Run Setup to either install, repair, or uninstall tabcmd, or with /layout, create a complete local copy of the installation bundle in the directory specified.</td>
<td>Default is to install, displaying UI and all prompts. If no directory is specified on a fresh install, C:\Program Files\Tableau\Tableau Server-&lt;version&gt;\extras\Command Line Utility is assumed.</td>
</tr>
<tr>
<td>/repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/uninstall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/layout&quot; &lt;directory&gt; &quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/passive</td>
<td>Run Setup with minimal UI and no prompts.</td>
<td></td>
</tr>
<tr>
<td>/quiet</td>
<td>Run Setup in unattended, fully silent mode. No UI or prompts are displayed.</td>
<td><strong>Note:</strong> Use either /silent or /quiet, not both.</td>
</tr>
<tr>
<td>/silent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>/norestart</td>
<td>Run Setup without restarting Windows, even if a restart is necessary.</td>
<td>Example: Run Setup without restarting Windows, even if a restart is necessary.</td>
</tr>
<tr>
<td>/log &quot;&lt;log-file&gt;&quot;</td>
<td>Log information to the specified file and path. By default log files are created in the user’s %TEMP% folder with a naming convention of Tableau_Server_Command_Line_utility_&lt;version_code&gt;.log. If no file location is specified, the log file is written to the user’s TEMP folder (C:\Users&lt;username&gt;\AppData\Local\Temp). Check this log file for errors after installation.</td>
<td>Example: Log information to the specified file and path. By default log files are created in the user’s %TEMP% folder with a naming convention of Tableau_Server_Command_Line_utility_&lt;version_code&gt;.log. If no file location is specified, the log file is written to the user’s TEMP folder (C:\Users&lt;username&gt;\AppData\Local\Temp). Check this log file for errors after installation.</td>
</tr>
<tr>
<td>Properties</td>
<td>Description</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ACCEPTEULA=1</td>
<td>0</td>
<td>Accept the End User License Agreement (EULA). Required for quiet, silent, and passive install. 1 = accept the EULA, 0 = do not accept the EULA.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If not included when using /passive,/silent or /quiet, Setup fails silently. If included but set to 0, Setup fails.</td>
</tr>
<tr>
<td>INSTALLDIR=</td>
<td>&quot;&lt;path\to\installation\directory&gt;&quot;</td>
<td>Install tabcmd to the specified non-default install location. If not used, tabcmd is installed to C:\Program Files\Tableau\Tableau Server&lt;version_code&gt;\extras\Command Line</td>
</tr>
</tbody>
</table>
Managing Background Jobs in Tableau Online

In Tableau Online, users can schedule extract refreshes, subscriptions, or flows to run periodically. These scheduled items are referred to as Tasks. The Backgrounder process initiates unique instances of these tasks to run them at the scheduled time. The unique instances of the tasks that are initiated as a result are referred to as Jobs. Jobs are also created for runs that are initiated manually, by clicking the Run Now option in the web interface, programmatically through REST API, or tabcmd commands.

For example, an extract refresh task is created to run daily at 9 AM. This is an extract refresh task, and every day at 9 AM, a job will be created for the Backgrounder to run.

Running all these jobs can mean that Backgrounder uses a lot of resources at various times during the day. Using the Job Management feature, Site administrators can get more details on these jobs that happen in their Site, and take action on those jobs to better manage resource usage.

The Run Now settings on the General settings page also allows you to manage your resources by either allowing or blocking users from running jobs manually. By default, this option is selected to allow users to run jobs manually. Clear the check box to prevent users from running jobs manually.

The Jobs page which contains the information about jobs can be accessed by navigating to the Existing Tasks menu of the left navigation menu.
Note: Information about jobs can only be viewed by site administrators.

Overview

This topic describes how to view and understand the information displayed in the Jobs page.

Your Tableau Online site comes with capacity to support all your users’ analytic needs. A site’s capacity includes capacity for storage and tasks that need to be performed on the site for extracts, metrics, subscriptions, and flows. The jobs page allows you to monitor the tasks for your Tableau Online site. For more information on site capacity, see Tableau Online Site Capacity.

At the top of the page there are high level statistics for the number of **Failed**, **Completed**, and **Canceled** jobs within the past 24 hours. Applying filters do not change these values.

For each job generated, there is a Job ID, the status of that job, the priority, the type of task that the job was generated from, the current run time - if the job is in-progress, current queue time - if queued, as well as the average run time, and average queue time.

Tableau records historical run times and queue times to compute the average run times and average queue times. Both average run times and average queue times are calculated as weighted averages using the following formula: 

\[
\frac{(\text{current run time or queue time average} \times 4) + \text{most recent run time or queue time}}{5}
\]
Tableau Online Help

The Job ID can be useful when viewing jobs on Admin views. When you click on the Job ID, you will see more detailed information about the job, such as the Job LUID, the project name, the schedule, the content name, content owner, job creator, and the last time the job ran successfully.

![Job Details](image)

**Note:** Doing a Refresh Now from the Data Sources page will only show the LUID information in the Job Details dialog box.

**Task Types**

There are several types of tasks:

- **Bridge Refresh:** Includes full and incremental extract refreshes that use Online schedules. For more information, see About Bridge Refresh jobs.

- **Extracts:** This includes extract creation, incremental extract refreshes, and full extract refreshes.

- **Subscriptions:** Includes subscriptions for workbooks and views. For more information, see Create a Subscription to a View or Workbook.

- **Flow:** This includes scheduled flows and manual flow runs.

- **Encryption:** Includes the following:
  - Extract encryption and decryption
  - Flow encryption and decryption
  - Re-key extracts and flows
Filters

You can filter to see only certain jobs. The available filters are by Job Status type, Task Type, and Time Range. For the Time Range filter, you can choose from past one to 24 hours, in four hour increments.

Canceling Jobs

Extract refreshes, subscriptions and flow run jobs can be canceled. You can only cancel one job at a time, and selecting multiple jobs at one time for cancellation is not supported.

When you cancel a job, an email with the time the job was canceled, the affected content, and the time the job ran before being canceled is sent to the recipients that you select in the Cancel Job dialog box. In addition you can add your customized notes to be included in the email.

If you do not select any recipients, the job will be canceled, but no email will be sent.

To cancel a job, click on the ellipses next to the Job ID and use the dialog to cancel the job:

![Job Status](image)

Status

There are seven types of status that jobs can be in, and hovering over each status will display more relevant information.

- **Completed**: This job shows as Completed successfully and you can see the time when the job completed in the tooltip that is displayed when you hover over the status.
• **In Progress:** This job shows as **In Progress**. A time for how long the job has been running for is displayed in the tooltip when you hover over the status.

• **In Progress:** This job is **In Progress**, but is **running late**. Tableau keeps track of the average run times for the same job, and if the current run time is longer than the average run time, then it is considered running late. Times for how much longer than average the job has been running and its average run time is provided in the tooltip that is displayed when you hover over the status.

• **Pending:** This job is currently **Pending**, waiting to be run when there is available Backgrounder capacity. A time for how long the job has been in the queue for is provided in the tooltip that is displayed when you hover over the status.
• **Pending:** This job is currently **Pending**, but is **running late**. Tableau keeps track of the average queue times for the same job, and if the current queue time is longer than the average queue time then it is considered running late. Times for how much longer than average the job has been queued is provided in the tooltip that is displayed when you hover over the status.

• **Canceled:** This job was **Canceled** by a Site administrator. The time the job was canceled and how long it ran for before cancellation is provided in the tooltip that is displayed when you hover over the status.

• **Failed:** This job is showing as **Failed**. The time when the job failed, how long it ran for before it failed, and why the job has failed is provided in the tooltip that is displayed when you hover over the status.
Suspended: This job is showing as Failed with a pause icon. If the job fails 5 times consecutively, then the job is suspended. Suspended tasks are still available but Backgrounder will not create jobs for these tasks until they are resumed by the user.

About Bridge Refresh jobs

Although Bridge Refresh jobs can generate the same statuses as other job types, Bridge Refresh jobs differ in the following ways:

- **Canceling jobs**: Bridge Refresh jobs can't be canceled from the Jobs page. Instead, ensure that Bridge clients are configured with the appropriate timeout limit to prevent any misuse of refreshes. For more information, see Configure a timeout limit for refreshes

- **"Sent to Bridge" job status**: A "Sent to Bridge" status indicates a completed Bridge Refresh job. A completed Bridge Refresh job means that the refresh job was successfully sent to a Bridge client in the pool. A completed Bridge Refresh job does not indicate whether the refresh itself completed successfully. If a refresh fails for whatever reason, the publisher (data source owner) is notified through both an account alert and a failure email alert. These alerts provide the publisher troubleshooting steps to help resolve the issue.
- **Subscription and Bridge Refresh jobs**: Subscription jobs can't be initiated by completed Bridge Refresh jobs. This is because a completed Bridge Refresh job only indicates whether the refresh job was successfully sent to a Bridge client in the pool and not whether the refresh job was completed successfully.

**Notes:**

- Refresh jobs that originate from Bridge (legacy) schedules are not captured on the Jobs page. To monitor refresh jobs for Bridge (legacy) schedules, you can refer to the Bridge Extracts admin view. For more information, see Bridge Extracts.
- For troubleshooting Bridge errors you see on the Jobs page, see Troubleshoot pooling.
Manage Data

After you configure your Tableau Online site with your logo and authentication options, you can start organizing the content framework for the way you and your users want to share Tableau data. To populate your Tableau Online site with content (data, reports, and so on), you or the data professionals in your organization publish that content. Depending on the type of license, users can connect to and publish content from Tableau Desktop, or from the Tableau Online web editing environment.

Types of content you can publish include standalone data sources that users can share among multiple workbooks, and workbooks that contain embedded data connections with visualizations based on that data. Each of these types has pros and cons, which are explained in the Publishing resources below.

Determine your organization’s publishing needs

As the site administrator, before you open the site for publishing, evaluate how much preparation you think is appropriate for your level of Tableau Online use:

- If you don’t have strict requirements around data access—for example, you have just a few users who all share the same data—you might dive in to the Publishing resources, starting with publishing steps, and adjust your publishing and content management practices as you go.

- If people use Tableau across distinct areas of your organization, or if you have a large Tableau user population, we recommend using the Publishing resources to create a test environment, and working out access and discoverability wrinkles. You can still adjust practices as you go, but it’s not as easy to do this after you open the site to a large group of active users.
Examples of additional factors you might need to consider are authorization (permissions for who gets access to what), data security and compliance requirements, minimizing users’ need to contact you for help if they can’t figure out where to publish or find their data, and so on. For more information, see Configure Projects, Groups, and Permissions for Managed Self-Service.

Summary of the publishing process

In Tableau Desktop, you open the workbook or data connection you want to upload to Tableau Online, and go to the Server menu to publish it.

During the publishing steps, you sign in to Tableau Online, entering the Tableau Online address (https://online.tableau.com) and your credentials.

The publishing steps require you to make decisions related to how you and others in your organization will access your data source or workbook. In some cases, this can involve a few layers of complexity, and it helps for you to understand how these layers fit together. Use the topics in the following lists to determine the level of complexity you need and to help establish appropriate publishing guidelines.

Publishing resources

These resources are part of the Tableau User Help and open in a new browser window.

- **Publishing concepts**
  
  Prepare for Publishing a Workbook

  Publish Data Sources and Workbooks

  Best Practices for Published Data Sources

- **Basic publishing steps for informal collaboration**

  Simple Steps to Share a Workbook

- **Comprehensive data source planning and publishing steps for meeting**
compliance and security standards, creating a data “source of truth,” and using best practices

Plan the Data Source

Publish a Data Source

Publish a Workbook

Tableau Online storage limit

A site has a 100 GB storage limit for workbooks and extracts. The storage limit is not configurable. For additional technical specifications for Tableau Online, see Technical Specifications on the Tableau website.

Tableau Online data connection support

You can publish data sources and workbooks using direct (live) or extract connections to your underlying database. You can also publish multi-connection data sources that use either or both types of connection. The database connections defined in the workbook or data source determines how you can publish and keep the data fresh on Tableau Online.

If you’re familiar with connection types and want a more specific list of data types and their supported connections, see Keep Data Fresh. Otherwise, read on.

Connector types that support direct (live) connections to Tableau Online

When you use live connections, published workbooks and data sources always reflect what is current in the underlying database.

Tableau Online supports live connections to:
• Google BigQuery, Amazon Redshift data, or SQL-based data hosted on a cloud platform; for example, Amazon RDS, Microsoft SQL Azure, or similar service.

For direct connections to cloud data, you usually need to add Tableau Online to your data provider’s authorized list.

• On-premises relational data, such as SQL Server or Oracle, when you use Tableau Bridge to maintain the connection.

To learn more about Tableau Bridge, see Use Tableau Bridge to Keep Data Fresh.

You can embed database credentials in live connections so all users who have access to the published content can see the underlying data. Or you can require users to provide their own database credentials. In that case, even if they can open the published content on the server, they need to sign in to the underlying database to see it.

**Connector types that support extract connections**

For any type of data that Tableau can connect to, users can publish extracts with embedded database credentials, and set up recurring refresh schedules.

You can create an extract in Tableau Desktop, before you initiate the publishing process, to have finer control over the connection definition. You might do this if you want to publish a sampling of the data, or to set up the ability to refresh incrementally. Otherwise, Tableau creates the extract during publishing, and you can do full refreshes only.

After Tableau completes the publishing step, it guides you through the steps for setting up a schedule for refreshing your data. If your Tableau data source or workbook connects to underlying data in the cloud, refreshes are run from Tableau Online directly. If the underlying data is on your local network, you use Tableau Bridge.

To learn more about Tableau Bridge, see Use Tableau Bridge to Keep Data Fresh.
Creators: Connect to Data on the Web

Before you can create a new workbook and build a view on the web to analyze your data on the web, you need to connect to your data. Tableau supports connecting to data sources on the web published through Tableau Desktop, or, connecting to data directly through Tableau Online, Tableau Server, or Tableau Public.

Starting in 2019.3, Tableau Catalog is available as part of the Data Management offering for Tableau Server and Tableau Online. When Tableau Catalog is enabled in your environment, in addition to navigating and connecting to data from Explore, you can navigate and connect to more kinds of data, like databases and tables, from Tableau Catalog For more information about Tableau Catalog, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help. Starting in 2021.4, Data Management includes virtual connections, a central access point to data. For more information, see "About Virtual Connections and Data Policies" in the Tableau Server or Tableau Online help.

**Note:** Data connections created in Tableau Server or Tableau Online are live connections only. If you need to use an extract for web authoring, you can publish your data source through Tableau Desktop. To publish through Tableau Desktop, see Publish Data Sources and Workbooks. However, data connections in Tableau Public are extracts only, and there is no way to publish a data source.

Open the Connect to Data page

On the web, you use the Connect to Data page to access data to connect to. After you sign in to Tableau Server or Tableau Online, you can open this page two ways:

- Home > New > Workbook
- Explore > New > Workbook

If you’re on Tableau Public, you can open this page from your author profile:

- My Profile > Create a Viz
Select the filter icon to filter by Connection Type and by Certified.

In addition to connecting to data sources, when you have Data Management, you can connect to data with a virtual connection. When Tableau Catalog is enabled you can also connect to databases, files, and tables.

- You can select from Data Sources, Virtual Connections, Databases and Files, or Tables to search for data.
When you select **Databases and Files** or **Tables**, you can filter assets by Data Quality Warning: All assets, Assets without warnings, and Assets with warnings.

On the Connect to Data page, the tabs you see depend on the product you have.

**Tableau Server**
On Tableau Server, select from the following tabs to connect to data: On this site, Files, and Connectors.

### Connect to data On this site

1. Select **On this site** to browse to or search for published data sources.
2. Select the data source under **Name** and click the **Connect** button.

**Note:** In addition to connecting to data sources, when you have Data Management, you can use **On this site** to connect to data using a virtual connection. When Tableau Catalog is enabled you can also connect to databases, files, and tables.

### Connect to files

Tableau supports uploading Excel, text-based data sources (.xlsx, .csv, .tsv), and spatial file formats that only require one file (.kml, .geojson, .topojson, .json, and Esri shapefiles and Esri File Geodatabases packaged in a .zip) directly in your browser. In the **Files** tab of the **Connect to Data** window, connect to a file by dragging and dropping it into the field or clicking **Upload from Computer**.

### Use connectors

From the **Connectors** tab, you can connect to data housed in a cloud database or on a server in your enterprise. You need to supply connection information for each data connection that you make. For example, for most data connections, you need to supply a server name and your sign-in information.

**Supported Connectors** has information on how to connect Tableau to each of these connector types to set up your data source. If the connector you need doesn't appear in the Connectors tab, you can connect to data through Tableau Desktop and publish your data source to Tableau Online or Tableau Server for web authoring. Learn more about how to **Publish a Data Source** in Tableau Desktop.
When Tableau successfully connects to your data, the Data Source page opens so that you can prepare the data for analysis and begin building your view. To learn more, see Creators: Prepare Data on the Web.

Tableau Server connectors

<table>
<thead>
<tr>
<th>Tableau Server Connectors</th>
<th>Google Drive</th>
<th>OData</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actian Matrix*</td>
<td>Google Drive</td>
<td>OData</td>
</tr>
<tr>
<td>Alibaba AnalyticDB for MySQL†</td>
<td>Impala‡</td>
<td>OneDrive</td>
</tr>
<tr>
<td>Alibaba Data Lake Analytics‡</td>
<td>Kognito*</td>
<td>Oracle‡</td>
</tr>
<tr>
<td>Alibaba MaxCompute‡</td>
<td>Kyvos</td>
<td>Pivotal Greenplum Database‡</td>
</tr>
<tr>
<td>Amazon Athena‡</td>
<td>Hortonworks Hadoop Hive</td>
<td>PostgreSQL‡</td>
</tr>
<tr>
<td>Amazon Aurora for MySQL‡</td>
<td>IBM BigInsights</td>
<td>Progress OpenEdge*</td>
</tr>
<tr>
<td>Amazon Redshift‡</td>
<td>IBM DB2</td>
<td>Presto‡</td>
</tr>
<tr>
<td>Apache Drill</td>
<td>IBM PDA (Netezza)*</td>
<td>Qubole Presto</td>
</tr>
<tr>
<td>Aster Database*</td>
<td>MariaDB‡</td>
<td>SAP HANA (for virtual connections only)‡</td>
</tr>
<tr>
<td>Box</td>
<td>Microsoft Azure SQL Database‡</td>
<td>SAP Sybase ASE*</td>
</tr>
<tr>
<td>Cloudera Hadoop</td>
<td>Presto‡</td>
<td>SAP Sybase IQ*</td>
</tr>
<tr>
<td>Databricks</td>
<td>MariaDB‡</td>
<td>Salesforce</td>
</tr>
<tr>
<td>Denodo‡</td>
<td>Microsoft Azure Synapse Analytics‡</td>
<td>SharePoint Lists</td>
</tr>
<tr>
<td>Dropbox</td>
<td>Microsoft SQL Server‡</td>
<td>SingleStore (formerly MemSQL)‡</td>
</tr>
<tr>
<td>Exasol‡</td>
<td>MonetDB*</td>
<td>Snowflake‡</td>
</tr>
<tr>
<td></td>
<td>MongoDB BI Connector‡</td>
<td>Spark SQL</td>
</tr>
</tbody>
</table>
Tableau Catalog Supported Connectors

Tableau Catalog supports making a connection with a subset of the data connectors that Tableau Server supports. If a data source, database, file, or table is grayed out, you can’t connect from Tableau Server. You can, however, connect from the Tableau Desktop Connect pane, if you have the correct permissions.

Tableau Online

On Tableau Online, select from the following tabs to connect to data: On this site, Files, Connectors, and Dashboard Starters.

Connect to data On this site

1. Select On this site to browse to or search for published data sources.
2. Select the data source under Name and click the Connect button.
Note: In addition to connecting to data sources, when you have Data Management, you can use On this site to connect to data using a virtual connection. When Tableau Catalog is enabled you can also connect to databases, files, and tables.

Connect to files

Tableau supports uploading Excel or text-based data sources (.xlsx, .csv, .tsv) directly in your browser. In the Files tab of the Connect to Data window, connect to an Excel or text file by dragging and dropping it into the field or clicking Upload from Computer.

Use connectors

From the Connectors tab, you can connect to data housed in a cloud database or on a server in your enterprise. You need to supply connection information for each data connection that you make. For example, for most data connections, you need to supply a server name and your sign-in information.

Supported Connectors has information on how to connect Tableau to your data using connectors. If the connector you need doesn't appear in the Connectors tab, you can connect to data through Tableau Desktop and publish your data source to Tableau Online or Tableau Server for web authoring. Learn more about how to Publish a Data Source in Tableau Desktop.

Note: If you’re unable to connect to your data from Tableau Online, check to see if the database is publicly accessible. Tableau Online can only connect to data that's accessible from the public internet. If your data is behind a private network, you can connect using Tableau Bridge. To learn more, see Publishers: Use Tableau Bridge to Keep Tableau Online Data Fresh.

Tableau Online Connectors

Alibaba AnalyticsDB for Exasol‡ OData
<table>
<thead>
<tr>
<th>Database/Analytics Services</th>
<th>Tableau Online Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>MySQL‡</td>
<td>Google BigQuery*‡</td>
</tr>
<tr>
<td>Alibaba Data Lake Analytics‡</td>
<td>Google Cloud SQL</td>
</tr>
<tr>
<td>Amazon Athena‡</td>
<td>(MySQL compatible)‡§</td>
</tr>
<tr>
<td>Amazon Aurora for MySQL‡</td>
<td>Google Drive</td>
</tr>
<tr>
<td>Amazon EMR Hadoop Hive</td>
<td>Hortonworks Hadoop Hive</td>
</tr>
<tr>
<td>Amazon Redshift‡</td>
<td>Impala‡</td>
</tr>
<tr>
<td>Azure Synapse Analytics (SQL Server compatible)</td>
<td>MapR Hadoop Hive</td>
</tr>
<tr>
<td>Box</td>
<td>Microsoft Azure SQL Database‡</td>
</tr>
<tr>
<td>Cloudera Hadoop</td>
<td>Microsoft Azure Synapse Analytics‡</td>
</tr>
<tr>
<td>Databricks</td>
<td>Microsoft SQL Server‡</td>
</tr>
<tr>
<td>Denodo‡</td>
<td>MongoDB BI Connector‡</td>
</tr>
<tr>
<td>Dropbox*</td>
<td>MySQL‡</td>
</tr>
<tr>
<td>OneDrive*</td>
<td>Oracle‡</td>
</tr>
<tr>
<td>Google Cloud SQL (MySQL compatible)‡§</td>
<td>PostgreSQL‡</td>
</tr>
<tr>
<td>Google Drive</td>
<td>Presto‡</td>
</tr>
<tr>
<td>Hortonworks Hadoop Hive</td>
<td>SAP HANA (for virtual connections only)‡</td>
</tr>
<tr>
<td>Impala‡</td>
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</tr>
<tr>
<td>MapR Hadoop Hive</td>
<td>SingleStore (formerly MemSQL)‡</td>
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<tr>
<td>Microsoft Azure SQL Database‡</td>
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<tr>
<td>Microsoft Azure Synapse Analytics‡</td>
<td>Spark SQL</td>
</tr>
<tr>
<td>Microsoft SQL Server‡</td>
<td>Teradata**‡</td>
</tr>
<tr>
<td>MongoDB BI Connector‡</td>
<td>Vertica‡</td>
</tr>
</tbody>
</table>

*For more information about using OAuth 2.0 standard for Google BigQuery, OneDrive, and Dropbox connections in Tableau Online, see OAuth Connections.

**Teradata web authoring currently does not support query banding functionality. See Teradata for details.

‡Supports virtual connections if you have Data Management. See About Virtual Connections and Data Policies in the Tableau Online help for details.

§Tableau Online doesn’t support SSL using Google Cloud SQL.
Tableau Catalog Supported Connectors

Tableau Catalog supports making a connection with a subset of data connectors that Tableau Online supports. If a data source, database, file, or table is grayed out, you can't connect from Tableau Online. You can, however, connect from the Tableau Desktop Connect pane, if you have the correct permissions.

Use Dashboard Starters

On Tableau Online, you can author and analyze data from LinkedIn Sales Navigator, Oracle Eloqua, Salesforce, ServiceNow ITSM, and QuickBooks Online using Dashboard Starters. On the Dashboard Starter tab, from the list of pre-built designs, select an option and click Use Dashboard. See Dashboard Starters for Cloud-based Data Sources for details.

Tableau Public

On Tableau Public, you can connect to data by uploading a supported file.

Connect to files

Tableau supports uploading Excel or text-based data sources (.xlsx, .csv, .tsv) directly in your browser. In the Files tab of the Connect to Data window, connect to an Excel or text file by dragging and dropping it into the field or clicking Upload from Computer. If you don't have a data set, check out the free sample data sets on the Tableau Public website.

Use connectors

From the Connectors tab, you can connect to data housed in a cloud database. You need to supply connection information for each data connection that you make. For example, for most data connections, you need to supply your sign-in information.

Supported Connectors has information on how to connect Tableau to your data using connectors. If the connector you need doesn't appear in the Connectors tab, you can connect to data through Tableau Desktop and create an extract.
Note: If you’re unable to connect to your data from Tableau Public, check to see if the database is publicly accessible. Tableau Public can only connect to data that’s accessible from the public internet.

Tableau Public Connectors

Google Drive

OData

After you connect

When Tableau connects to your data, the Data Source page opens so that you can prepare the data for analysis and begin building your view. To learn more, see Creators: Prepare Data on the Web.

Keep data fresh in web authoring

Update uploaded files in Tableau Online or Tableau Server: If you manually upload a file (Excel or text) for web authoring, Tableau can’t refresh the file automatically. To update your data, select “Edit Connection” to upload a new version of the file.

In Tableau Public, go to your viz and click Request Update. You can also keep your data fresh automatically by selecting “Keep this data in sync” in Tableau Desktop Public Edition.

Update file-based published data sources in Tableau Online: If you have a published data source in Tableau Online (published through Tableau Desktop) that uses file-based data, you can keep it fresh using Tableau Bridge. For more information, see Expand Data Freshness Options by Using Tableau Bridge.
Run Initial SQL

**Note:** Tableau Prep Builder version 2019.2.2 and later supports using Initial SQL, but doesn’t yet support all of the same options supported by Tableau Desktop. For information about using Initial SQL with Tableau Prep Builder, see Use Initial SQL to query your connections in the Tableau Prep Builder online help.

When connecting to some databases, you can specify an initial SQL command that will run when a connection is made to the database, for example, when you open the workbook, refresh an extract, sign in to Tableau Server, or publish to Tableau Server. Initial SQL is not run when your refresh your view. Note that this initial SQL is different than a custom SQL connection. A custom SQL connection defines a relation (or table) to issue queries against. For more information, see Connect to a Custom SQL Query.

You can use this command to:

- Set up temporary tables to use during the session.
- Set up a custom data environment.

You have the option to add an initial SQL command in the Server Connection dialog box or on the Data Source page.

**Note:** 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. For information about your data source, see Supported Connectors.

To use initial SQL

1. In the Server Connection dialog box, click Initial SQL. Or, on the Data Source page, select Data > Initial SQL or Data > Query Banding and Initial SQL depending on the database you connect to.

2. Enter the SQL command into the Initial SQL dialog box. You can use the Insert drop-
down menu to pass parameters to your data source.

![Initial SQL dialog](image)

SQL statements to be executed at connect time:

```
CREATE TABLE TEST_TABLE (TESTid int)
```

**Note:** Tableau does not examine the statement for errors. This SQL statement is simply sent to the database when you connect.

Your software license may restrict you from using initial SQL with your connection. If you publish to Tableau Server, the server must be configured to allow Initial SQL statements. By default, the server software is configured to allow these statements to run when the workbook is loaded in a web browser.

Administrators can configure server to ignore initial SQL statements by using the `tsm configuration set` command:

```
$ tsm configuration set -k vizqlserver.initialsql.disabled -v true
```

If the server doesn’t allow initial SQL statements, the workbook opens, but the initial SQL commands are not sent.

For more information about the `tsm configuration set` command, see the Tableau Server Help.
Parameters in an initial SQL statement

You can pass parameters to your data source in an initial SQL statement. There are several reasons why this is useful:

- You can configure impersonation using the `TableauServerUser` or `TableauServerUserFull` parameters.
- If your data source supports it, you can set up row-level security (for example, for Oracle VPD or SAP Sybase ASE) to make sure that users see only the data that they are authorized to see.
- You can provide more details in logging, for example, the Tableau version or the work-book name.

The following parameters are supported in an initial SQL statement:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Example of returned value</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>TableauServerUser</code></td>
<td>The user name of the current server user. Use when setting up impersonation on the server. Returns an empty string if the user is not signed in to Tableau Server.</td>
<td>jsmith</td>
</tr>
<tr>
<td><code>TableauServerUserFull</code></td>
<td>The user name and domain of the current server user. Use when setting up impersonation on the server. Returns an empty string if the user is not signed in to Tableau Server.</td>
<td>domain.lan\jsmith</td>
</tr>
<tr>
<td><code>TableauApp</code></td>
<td>The name of the Tableau application.</td>
<td>Tableau Desktop Professional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tableau Server</td>
</tr>
<tr>
<td><code>TableauVersion</code></td>
<td>The version of the Tableau application.</td>
<td>9.3</td>
</tr>
</tbody>
</table>
WorkbookName

The name of the Tableau workbook. Use only in workbooks with an embedded data source.

Examples

The following examples show different ways you can use parameters in an initial SQL statement.

- This example sets the security context on Microsoft SQL Server:

  ```sql
  EXECUTE AS USER = [TableauServerUser] WITH NO REVERT;
  ```

- This example shows how, on a DataStax data source, you can use parameters to add detail to logging or to set up a session variable to keep track of the data:

  ```sql
  SET TABLEAUVERSION [TableauVersion];
  ```

- This example can be used to help set up row-level security for Oracle VPD:

  ```plsql
  begin
  DBMS_SESSION.SET_IDENTIFIER([TableauServerUser]);
  end;
  ```

  **Note:** Oracle PL/SQL blocks require a trailing semicolon to terminate the block. Consult Oracle documentation for the proper syntax.

Defer execution to the server

You can defer an initial SQL statement so that it is executed only on the server. One reason to defer execution to the server is if you don’t have permission to execute the commands that set up impersonation. Use `<ServerOnly>` tags to enclose the commands to be executed only on the server.

Example:
CREATE TEMP TABLE TempTable(x varchar(25));
INSERT INTO TempTable VALUES (1);
<ServerOnly>INSERT INTO TempTable Values(2);</ServerOnly>

Security and impersonation

If you use the TableauServerUser or TableauServerUserFull parameter in an initial SQL statement, you will create a dedicated connection that can't be shared with other users. This will also restrict cache sharing, which can enhance security, but may also slow performance.

Troubleshoot 'create table' for MySQL and Oracle connections

For MySQL connections, tables are not listed after using initial SQL to create table

When you connect to MySQL, if you run an initial SQL statement like the following, tables might not show because of the way Tableau constructs the query:

CREATE TABLE TestV1.testtable77(testID int);

To resolve this issue, add IF NOT EXISTS to the SQL statement:

CREATE TABLE IF NOT EXISTS TestV1.TestTable(testID int);

For Oracle connections, using initial SQL to create table causes Tableau to stall

When you connect to Oracle and run an initial SQL statement like the following, Tableau is stalled with a spinning wheel because of the way Tableau constructs the query:

CREATE TABLE TEST_TABLE (TESTid int)

To resolve this issue, use the following SQL statement:

BEGIN
EXECUTE IMMEDIATE 'create table test_table(testID int)';
EXCEPTION
Extract Upgrade to .hyper Format

Beginning in version 10.5, new extracts use the .hyper format instead of the .tde format. Extracts in the .hyper format take advantage of an improved data engine, which supports the same fast analytical and query performance as the data engine before it, but for even larger extracts.

Although there are many benefits of using .hyper extracts, the primary benefits include the following:

- **Create larger extracts**: Extracts in the .hyper format can contain billions of rows of data. Because .hyper extracts can support more data, you can use version Tableau Desktop Current to consolidate .tde extracts that you previously had to create separately.

- **Faster extract creation and refreshes**: While Tableau has always optimized performance for creating and refreshing extracts, this release supports faster extract creation and refreshes for even larger data sets.

- **Better performance when interacting with views that use larger extract data sources**: Views that use extract data sources perform better than they did previously. Although smaller extracts continue to perform efficiently, larger extracts perform more efficiently.

What causes an extract upgrade?

Although you can continue to open and interact with .tde extracts in version Current, when you perform an extract task on a .tde extract, the .tde extract is upgraded to a .hyper extract. After the extract is upgraded, you should be aware of the following backward limitations:
You can't convert the upgraded extract back to a .tde extract.

You can't open the upgraded extract in an earlier version of Tableau Desktop.

You can't use the Export as Version in Tableau Desktop to downgrade a workbook that contains a .hyper extract.

You can't open a workbook in Tableau Desktop 10.4 and earlier that is downloaded from Tableau Online using the Download Tableau Workbook option if the workbook contains a .hyper extract.

Tasks that cause an extract upgrade

There are three distinct ways a .tde extract can get upgraded to a .hyper extract: 1.) during an extract refresh (full or incremental), 2.) when appending data to an extract, and 3.) when an extract is upgraded manually using Tableau Desktop Current. After an extract has been upgraded, the original .tde extract is automatically removed from Tableau Online if it's not being reference by other workbooks.

The followings tasks will upgrade a .tde extract to a .hyper extract on Tableau Online:

- Manual extract refresh
- Incremental extract refresh using Tableau Bridge
  
  **Note:** A full refresh of a .tde extract using Tableau Bridge 10.4 and earlier does not upgrade the extract.

- A scheduled full or incremental extract refresh

- A scheduled incremental extract refresh using Tableau Bridge
  
  **Note:** A full refresh of a .tde extract using Tableau Bridge 10.4 and earlier does not upgrade the extract.
Automated refresh tasks that are performed through the Extract Command-Line Utility

Automated append data to an extract using tabcmd

Automated append data to an extract using the Extract Command-Line Utility

Impact of extract upgrade

In general, Tableau recommends that you upgrade to Tableau Desktop Current to match the latest version of Tableau Online. By using the latest version Tableau Desktop, you can avoid certain extract compatibility issues when working with extracts that were created using earlier versions of Tableau Desktop.

If you cannot upgrade to the latest version of Tableau Desktop, review a detailed explanation of the extract compatibility scenarios on the Tableau Support page or a summary explanation below to better understand when extract upgrades can occur and potential compatibility issues you or others might experience.

**Note:** In the tables below, "10.4" represents Tableau 10.4 and earlier and "10.5" represents Tableau 10.5 and later.

Performing tasks on Tableau Online

When working with extracts created in an earlier version of Tableau Desktop, you should be aware of the following extract-related compatibility scenarios around tasks performed on Tableau Online.

<table>
<thead>
<tr>
<th>Task</th>
<th>10.4 workbook</th>
<th>10.5 workbook</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
</tr>
<tr>
<td>Publish from Tableau Desktop 10.4</td>
<td>✓</td>
<td>Not possible</td>
</tr>
</tbody>
</table>
### Refreshing extracts using Tableau Bridge

When working with extracts created in earlier versions of Tableau, you should be aware of the following extract-related compatibility scenarios around refreshing extracts using Tableau Bridge.

<table>
<thead>
<tr>
<th>Task</th>
<th>10.4 workbook</th>
<th>10.5 workbook</th>
<th>.hyper extract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
<td>.hyper extract</td>
</tr>
<tr>
<td>Publish from Tableau Desktop 10.5</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Refresh or scheduled refresh</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>✓</td>
</tr>
<tr>
<td>Edit/save in web authoring</td>
<td>Workbook version changes to 10.5, but extract remains in .tde format</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Edit/save in web authoring then refresh or append</td>
<td>Workbook version changes to 10.5, and extract upgrades to .hyper format</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>✓</td>
</tr>
<tr>
<td>Task</td>
<td>10.4 workbook</td>
<td>10.5 workbook</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
<td>.hyper extract</td>
</tr>
<tr>
<td>Full refresh from Tableau Bridge 10.4</td>
<td>√</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Incremental refresh or append</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>√</td>
</tr>
<tr>
<td>Full refresh from Tableau Bridge 10.5</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>√</td>
</tr>
<tr>
<td>Incremental refresh and append</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
<td>√</td>
</tr>
</tbody>
</table>

**Downloading from Tableau Online**

When working with extracts created in earlier versions of Tableau, you should be aware of the following extract-related compatibility scenarios when downloading from Tableau Online.

<table>
<thead>
<tr>
<th>Task</th>
<th>10.4 workbook</th>
<th>10.5 workbook</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
</tr>
<tr>
<td>Download and open in</td>
<td>√</td>
<td>Can't open work-</td>
</tr>
</tbody>
</table>
### Automating extract refresh and append tasks

When working with extracts created in earlier versions of Tableau, you should be aware of the following extract-related compatibility scenarios around automating refresh and append tasks from `tabcmd` and the Tableau Command-Line Utility.

<table>
<thead>
<tr>
<th>Task</th>
<th>10.4 workbook</th>
<th>10.5 workbook</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
</tr>
<tr>
<td>Tableau Desktop 10.4</td>
<td>book; you see a &quot;this workbook uses a .hyper extract and is not compatible with this version; open the workbook in version 10.5 or later&quot; error message, and then asked to locate the extract</td>
<td></td>
</tr>
<tr>
<td>in Tableau Desktop 10.5</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Export As Version from Tableau Desktop 10.5</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Task</td>
<td>10.4 workbook</td>
<td>10.5 workbook</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>.tde extract</td>
<td>.tde extract</td>
</tr>
<tr>
<td>Refresh or append</td>
<td>using 10.4 tabcmd</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
</tr>
<tr>
<td></td>
<td>using 10.5 tabcmd</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
</tr>
<tr>
<td>Publish extract</td>
<td>using 10.4 tabcmd</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>using 10.5 tabcmd</td>
<td>Not possible</td>
</tr>
<tr>
<td>Refresh or append</td>
<td>using 10.4 Tableau Command-Line Utility</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>using 10.5 Tableau Command-Line Utility</td>
<td>Workbook version remains unchanged, but extract upgrades to .hyper format</td>
</tr>
</tbody>
</table>
Why keep an extract in .tde format?

If you cannot upgrade to the latest version of Tableau Desktop or Tableau Bridge, you'll need to keep your extract in .tde format.

How to keep an extract in .tde format

To keep an extract in the .tde format, you'll need to avoid upgrading the extract. To avoid upgrading the extract, do not perform any of the tasks listed above in the Tasks that cause an extract upgrade section to a .tde extract.

Then, consider the following suggestions if you need to maintain a .tde version of an extract:

- Perform extracts tasks using Tableau Online, but maintain an earlier version of Tableau Desktop and the ability to connect to the original data to recreate .tde extracts.

- Use an earlier version of Tableau Desktop to perform extract tasks, such as extract refresh or append data.

- Disable existing extract refresh schedules on Tableau Online or Tableau Bridge until you can identify which extracts should and shouldn't be upgraded.

  **Note:** To access an extract's refresh schedule, you must be a data source owner, site administrator, or Project Leader. For more information about which site roles allow full Project Leader capabilities, see Project-level administration.

What to expect after an extract upgrade

After your extract has been upgraded, there are some additional changes you can expect when working with extracts in version Current. For more information, see After an extract upgrade section in Tableau Help.
Create Extracts on the Web

You can extract your data sources in the web (without using Tableau Desktop) to improve data source performance and support additional analytical functions. When you extract your data source, Tableau will copy the data from your remote data store to Tableau Server or Online. To learn more about the benefits of extracting your data, see Extract Your Data. In the web, you can extract while in Web Authoring or while in Content Server.

Create extracts in Web Authoring

You can create extracts directly in web authoring with default extract settings.

Extract an Embedded Data Source in Web Authoring

To create an extract in web authoring:
Tip: It is recommended to finalize your data model before you create the extract. Extract creation may take a long time and any changes to your data model, such as adding new logical tables, will invalidate the extract.

1. Click the Data Source tab in the bottom left corner of the web authoring pane. For new workbooks, you will start in the Data Source tab.
2. In the top-right corner, change the connection type from Live to Extract.
3. Click Create Extract. You will see the Creating Extract dialog box.

Extract creation might take a long time and you can close your authoring session while the extract is being created. To ensure your extract creation is not lost, in the dialog box, click Notify Me When Complete to specify a location for the extracted workbook to be saved. If your extract succeeds, your workbook will be saved to the specified location and you will be notified that you can continue your web authoring session. If your extract creation fails, you will be notified that the extract could not be created and you can restore your unsaved changes by reopening the original workbook in web authoring.
Define your Extract Settings

Optionally, configure one or more of the following options to tell Tableau how to store, define filters for, and limit the amount of data in your extract:

- **Decide how the extract data should be stored**

  You can choose to have Tableau store the data in your extract using one of two structures (schemas): logical tables (denormalized schema) or physical tables (normalized schema). For more information about logical and physical tables, see [The Tableau Data Model](https://www.tableau.com/support/tableau-data-model).
The option you choose depends on what you need.

- **Logical Tables**

  Stores data using one extract table for each logical table in the data source. Physical tables that define a logical table are merged and stored with that logical table. For example, if a data source was made of a single logical table, the data would be stored in a single table. If a data source was made of three logical tables (each containing multiple physical tables), the extract data would be stored in three tables—one for each logical table.

  Select **Logical Tables** when you want to limit the amount of data in your extract with additional extract properties like extract filters, aggregation, Top N, or other features that require denormalized data. Also use when your data uses pass-through functions (RAWSQL). This is the default structure Tableau uses to store extract data. If you use this option when your extract contains joins, the joins are applied when the extract is created.

- **Physical Tables**

  Stores data using one extract table for each physical table in the data source.

  Select **Physical Tables** if your extract is comprised of tables combined with one or more equality joins and meets the conditions for using the Physical Tables option listed below. If you use this option, joins are performed at query time.

  This option can potentially improve performance and help reduce the size of the extract file. For more information about how Tableau recommends you use the Physical Tables option, see Tips for using the Physical Tables option in the Tableau Desktop help. In some cases, you can also use this option as a work-around for row-level security. For more information about row-level security
using Tableau, see Restrict Access at the Data Row Level in the Tableau Desktop help.

Conditions for using the Physical Tables option

To store your extract using the Physical Tables option, the data in your extract must meet all of the conditions listed below.

- All joins between physical tables are equality (=) joins
- Data types of the columns used for relationships or joins are identical
- No pass-through functions (RAWSQL) used
- No incremental refresh configured
- No extract filters configured
- No Top N or sampling configured

When the extract is stored as physical tables, you cannot append data to it. For logical tables, you can't append data to extracts that have more than one logical table.

**Note:** Both the Logical Tables and Physical Tables options only affect how the data in your extract is stored. The options do not affect how tables in your extract are displayed on the Data Source page.

- **Determine how much data to extract**

  Click Add to define one or more filters to limit how much data gets extracted based on fields and their values.

- **Aggregate the data in the extract**

  Select **Aggregate data for visible dimensions** to aggregate the measures using their default aggregation. Aggregating the data consolidates rows, can minimize the size of the extract file, and increase performance.
When you choose to aggregate the data, you can also select **Roll up dates** to a specified date level such as Year, Month, etc. The examples below show how the data will be extracted for each aggregation option you can choose.

**Original data**

<table>
<thead>
<tr>
<th>Date</th>
<th>Region</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2009</td>
<td>South</td>
<td>$500</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>West</td>
<td>$200</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>West</td>
<td>$100</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>East</td>
<td>$300</td>
</tr>
<tr>
<td>1/2/2009</td>
<td>South</td>
<td>$600</td>
</tr>
<tr>
<td>1/2/2009</td>
<td>South</td>
<td>$400</td>
</tr>
<tr>
<td>1/2/2009</td>
<td>East</td>
<td>$100</td>
</tr>
</tbody>
</table>

**Aggregate data for visible dimensions (no roll up)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Region</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2009</td>
<td>East</td>
<td>$300</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>South</td>
<td>$500</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>West</td>
<td>$300</td>
</tr>
<tr>
<td>1/2/2009</td>
<td>East</td>
<td>$100</td>
</tr>
<tr>
<td>1/2/2009</td>
<td>South</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

**Aggregate data for visible dimensions (roll up dates to Month)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Region</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/2009</td>
<td>East</td>
<td>$400</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>South</td>
<td>$1,500</td>
</tr>
<tr>
<td>1/1/2009</td>
<td>West</td>
<td>$300</td>
</tr>
</tbody>
</table>

**Choose the rows to extract**

Select the number of rows you want to extract.

You can extract **All rows** or the **Top N** rows. Tableau first applies any filters and aggregation and then extracts the number of rows from the filtered and aggregated data.
results. The number of rows options depend on the type of data source you are extracting from.

Notes:

- Not all data sources support sampling. Therefore, you might not see the **Sampling** option in the Extract Data dialog box.

- Any fields that you hide first in the Data Source page or on the sheet tab will be excluded from the extract.

Limitations

- You can’t create extracts for embedded data sources that reference published data sources. As a workaround, create the extract directly on the published data source. For more information, see Extract a Published Data Source on Content Server.

- You can’t create extracts for file-based data sources. File-based data sources already have special performance features and adding extraction will have no performance benefit.

- This feature does not apply to bridge-based data sources in Tableau Online.

Create extracts in Content Server

Extract a Published Data Source on Content Server
To extract a published data source:

1. Sign in as an administrator or as the owner of the data source.
2. On the Content tab, select **Explore > Data sources**.
3. Select a data source by clicking on the Data Source name.
4. At the top of the screen, under the Data Source name, select the drop-down menu that says **Live**.
5. Change the connection type from **Live** to **Extract**. If the extract encryption at rest feature is enabled on the site, select either **Encrypted** or **Unencrypted**.
6. If you see an error message about embedded credentials, embed your credentials in the data source. To do this, click **Edit Connection**. Select "Embedded password in connection" and then click **Save**.

**Extract an Embedded Data Source on Content Server**

To extract one or more data sources that are embedded in a published workbook:

1. Sign in as an administrator or as the owner of the data source.
2. Navigate to the published workbook.
3. Navigate to the Data Sources tab
4. Select one or more of the data sources.
5. Click the **Action** button.
6. Click **Extract**. If the extract encryption at rest feature is enabled on the site, select either **Encrypted** or **Unencrypted**.

**Limitations**

- Your connection credentials must be embedded in the data source.
- In the web, you can’t specify extract settings like incremental refresh and extract filters.
- You can't create extracts for embedded data sources that reference published data sources. As a workaround, create the extract directly on the published data source.
- You can't create extracts for file-based data sources. File-based data sources already have special performance features and adding extraction will have no performance benefit.
- This feature does not apply to bridge-based data sources in Tableau Online.

**Keep Extracted Data Fresh**

After data is extracted, you can optionally set up an extract refresh schedule to keep the data fresh. For more information, see Schedule Refreshes on Tableau Online.

**Monitor and Manage Extracts**

Server administrators can monitor extract creation on the **Background Tasks for Extracts** admin view. For more information, see Background Tasks for Extracts.

Server administrators can manage extracts on the Jobs page. For more information, see Managing Background Jobs in Tableau Online.
Keep Data Fresh

After you publish workbooks and data sources to Tableau Online, you can decide how you want to keep the data current. Options for keeping published data fresh depend on the characteristics of your data sources.

Data freshness options by data source

The following table lists data freshness options (and exceptions) that are available depending on the data source.

Exceptions

- Tableau Online does not support connections to any cube-based data source.
- Tableau Online does not support published connections that use Kerberos authentication.
- Although you can publish extracts of SAP BW data to Tableau Online, refreshes are not supported. The best way to update SAP BW data sources is to republish them.

Options

<table>
<thead>
<tr>
<th>Source</th>
<th>Publish options</th>
<th>Freshness options</th>
<th>Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-premises data (accessible only from a private network)</td>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>File-based data</td>
<td>Extract only</td>
<td>Use Tableau Bridge (recommended)</td>
<td>n/a</td>
</tr>
<tr>
<td>(Excel, .csv, .txt)</td>
<td></td>
<td>Manual refresh from Tableau Desktop</td>
<td></td>
</tr>
<tr>
<td>Statistical file</td>
<td>Extract only</td>
<td>Use Tableau Bridge (recommended)</td>
<td>n/a</td>
</tr>
<tr>
<td>(SAS (*.sas7b-</td>
<td></td>
<td>Manual refresh from Tableau Desktop</td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td>Publish options</td>
<td>Freshness options</td>
<td>Authentication</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------</td>
<td>-------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>dat)</td>
<td></td>
<td>Automated command-line scripts</td>
<td></td>
</tr>
<tr>
<td>Data hosted on a cloud platform</td>
<td>Live connection or extract, depending on database</td>
<td></td>
<td>Embedded credentials in Tableau Bridge settings</td>
</tr>
<tr>
<td>(For example, Oracle on Amazon RDS)</td>
<td></td>
<td>Use Tableau Bridge (recommended)</td>
<td></td>
</tr>
<tr>
<td>Relational database</td>
<td>Live connection or extract, depending on database</td>
<td>Manual refresh from Tableau Desktop</td>
<td>Embedded credentials in Tableau Bridge settings</td>
</tr>
<tr>
<td>(Relational databases that Tableau Desktop connects to. For example, SQL Server, Oracle, IBM DB2)</td>
<td></td>
<td>Use Tableau Bridge (recommended)</td>
<td></td>
</tr>
</tbody>
</table>

**Cloud data (accessible from the public internet)**

<table>
<thead>
<tr>
<th>Source</th>
<th>Publish options</th>
<th>Freshness options</th>
<th>Authentication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data hosted on cloud platforms</td>
<td>Live connection or extract</td>
<td>Extracts:</td>
<td>Embedded credentials + IP safe list</td>
</tr>
<tr>
<td>(See the list of supported platforms in)</td>
<td></td>
<td>Schedule directly on Tableau Online</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Edit Connections on Tableau Online</td>
</tr>
<tr>
<td>Source</td>
<td>Publish options</td>
<td>Freshness options</td>
<td>Authentication</td>
</tr>
<tr>
<td>--------</td>
<td>----------------</td>
<td>-------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Allow Direct Connections to Data Hosted on a Cloud Platform</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salesforce, Google Analytics</td>
<td>Extract only</td>
<td><strong>Schedule directly on Tableau Online</strong></td>
<td>OAuth Connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Refresh Data Using Saved Credentials</strong></td>
<td></td>
</tr>
<tr>
<td>Google BigQuery, Google Sheets</td>
<td>Live connection or extract</td>
<td><strong>Schedule directly on Tableau Online</strong></td>
<td>OAuth Connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Refresh Data Using Saved Credentials</strong></td>
<td></td>
</tr>
<tr>
<td>Cloud (Box, Dropbox, OneDrive, Google Drive) file-based data</td>
<td>Live connection or extract</td>
<td><strong>Schedule directly on Tableau Online</strong></td>
<td>OAuth Connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Refresh Data Using Saved Credentials</strong></td>
<td></td>
</tr>
<tr>
<td>(Excel, .csv, .txt, .tab, .tsv, .json)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaplan</td>
<td>Extract only</td>
<td><strong>Schedule directly on Tableau Online</strong></td>
<td>Embedded credentials</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Refresh Data Using Saved Credentials</strong></td>
<td></td>
</tr>
<tr>
<td>Oracle Eloqua</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ServiceNow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITSM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tableau Online Help
### Tableau Online IP addresses for data provider authorization

As a security measure, cloud data providers might require you to supply a list of authorized IP addresses from which external applications request access to your data. A request from an IP address that is not explicitly approved could be rejected. To make sure live connections you publish to Tableau Online remain uninterrupted, add Tableau Online to your data provider’s allowlist (safe list).

The table lists IP address ranges Tableau Online uses, depending on your site location. You can see its location in the URL that appears after you sign in to Tableau Online.

<table>
<thead>
<tr>
<th>Host Name (Instance)</th>
<th>Site Location</th>
<th>IP Address or Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>10ax.online.tableau.com</td>
<td>US West - Oregon</td>
<td>34.208.207.197</td>
</tr>
<tr>
<td>Host Name (Instance)</td>
<td>Site Location</td>
<td>IP Address or Range</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>10ay.online.tableau.com</td>
<td>US West - Oregon</td>
<td>34.218.129.202</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.39.159.250</td>
</tr>
<tr>
<td>10az.online.tableau.com</td>
<td>US West - Oregon</td>
<td>34.218.83.207</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.40.235.24</td>
</tr>
<tr>
<td>us-west-2b.online.tableau.com</td>
<td>US West - Oregon</td>
<td>34.214.85.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.214.85.244</td>
</tr>
<tr>
<td>us-east-1.online.tableau.com</td>
<td>US East - Virginia</td>
<td>50.17.26.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.206.162.101</td>
</tr>
<tr>
<td>prod-useast-a.online.tableau.com</td>
<td>US East - Virginia</td>
<td>3.219.176.16/28</td>
</tr>
<tr>
<td>prod-useast-b.online.tableau.com</td>
<td>US East - Virginia</td>
<td>3.219.176.16/28</td>
</tr>
<tr>
<td>dub01.online.tableau.com</td>
<td>EU West - Ireland</td>
<td>34.246.74.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.215.158.213</td>
</tr>
<tr>
<td>eu-west-1a.online.tableau.com</td>
<td>EU West - Ireland</td>
<td>34.246.62.141</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.246.62.203</td>
</tr>
<tr>
<td>prod-apnortheast-a.online.tableau.com</td>
<td>Asia Pacific - Japan</td>
<td>18.176.203.96/28</td>
</tr>
<tr>
<td>prod-apsoutheast-a.online.tableau.com</td>
<td>Asia Pacific - Australia</td>
<td>3.25.37.32/28</td>
</tr>
<tr>
<td>Host Name (Instance)</td>
<td>Site Location</td>
<td>IP Address or Range</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>prod-uk-a.online.tableau.com</td>
<td>EU West - UK</td>
<td>18.134.84.240/28</td>
</tr>
<tr>
<td>prod-ca-a.online.tableau.com</td>
<td>Canada - Quebec</td>
<td>3.98.24.208/28</td>
</tr>
</tbody>
</table>

These addresses are dedicated to and controlled by Tableau.

**Note:** In addition to enabling communication over the Tableau Online IP range, you might need to enable access over the appropriate database port (for example, 80 or 443) depending on the communication type (HTTP or HTTPS).

**Find authorization steps for your data provider**

The following links take you to the steps on common data providers’ websites for authorizing external applications on their platforms.

**Amazon:**

- Redshift
- RDS
- EC2

**Microsoft Azure**

**Google Cloud Platform**

**Disclaimer:** The links in the list above take you outside of Tableau.com. 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.
Tableau Bridge connections to Tableau Online

To facilitate connections between on-premises data and Tableau Online, Tableau Bridge uses common port 443 to make outbound requests to Tableau Online. For more information, see Network access section in the Install Tableau Bridge topic.

See also

- Manage Data
- Best Practices for Published Data Sources (Tableau Help)
- Notify Owners When Extract Refreshes Fail
- Edit Connections on Tableau Online

Allow Direct Connections to Data Hosted on a Cloud Platform

If you maintain SQL-based data on a cloud platform, you can use direct connections to that data when you publish workbooks and data sources to Tableau Online. When you use a direct connection, you don’t need to publish a static extract of the data. Depending on the underlying data type, you can determine how to keep the data current through a live connection or refreshing an extract on a schedule. You can also require users to provide credentials for accessing the data when they open views that connect to content.
Enable encrypted connections

Encrypting connections using SSL is an option for underlying data sources. You can enable SSL encryption for connections to your hosted SQL data when you create the connection in Tableau Desktop. Complete the following steps to enable encrypted connections.

**Tip:** Make sure that Tableau Online is on your data provider’s authorized list (safe list).

1. In Tableau Desktop, connect to the data.
2. In the Server Connection dialog box, select the Require SSL check box.
3. For PostgreSQL, SQL Server-compatible connections, and other connections that don’t have a option to embed certificates in the data source, click **OK** to finish.

   For some compatible connections, linked text appears under the **Require SSL** check box. This indicates that you can specify an alternative certificate file to use, such as a self-signed certificate.

4. (Optional) Use a self-signed or other custom certificate to connect to this data over SSL.
   a. Select the link text that appears.

   ![Select link text](image)

   b. In the **Configure and Use SSL Certificate** dialog, specify the certificate’s .pem file.
For example, for MySQL connections to data hosted on Amazon RDS, you can point to Amazon's self-signed certificate file at this address.

**Untrusted certificates**

If you are using certificates that aren't trusted by Tableau Online, such as self-signed certificates, or certificates signed by your company's internal CA, you may have problems connecting from Tableau Online. Try one of the following solutions.

- If your connector allows embedding custom certificates, then use that. This is the solution described above.
- Get new certificates for your database which are signed by a trusted public CA.
- Use Tableau Bridge, which is Tableau’s connection proxy. You can configure your certificates to be trusted on the machine running Bridge, either by using TDC files, properties files, or by installing your certificates in the Windows System Trust Store.

**Supported connectors**

Refer to the "Tableau Online" tab in the Creators: Connect to Data on the Web topic for the list of supported connectors.

For more information about supported features by connector, refer to the specific connector topic in the Supported Connectors section of the Tableau User Help.

**Note:** Not all connectors in this list are supported by Tableau Prep Conductor. To see the supported list of connectors, open Tableau Prep Builder and expand the Connect pane.

**See also**

- Connector Examples in the Tableau Help
Overview of Row-Level Security Options in Tableau

Sometimes you want to filter data based on the user that is requesting it. For example:

- You want regional salespeople to see sales figures only for their region.
- You want sales managers to see statistics only for salespeople that report to them.
- You want students to see visualizations based only on their own test scores.

An approach to filtering data this way is called row-level security (RLS). There are multiple methods to accomplish row-level security both inside and outside of Tableau, each with its own pros and cons.

Create a user filter and map users to values manually

The simplest way to achieve row-level security in Tableau is through a user filter where you manually map users to values. For example, you could manually map a user named “Alice” to the value “East” so that she only sees rows in the data source where the “Region” column is “East”.

This method is convenient but high maintenance, and attention must be paid to security. It must be done per-workbook, and you must update the filter and republish the data source as your user base changes. When you publish an asset with this type of user filter, you need to set permissions so that users cannot save or download it and remove the filter, thereby gaining access to all of the data.

For more information, see Create a user filter and map users to values manually in the Tableau Desktop and Web Authoring help.

Create a dynamic user filter using a security field in the data

Using this method, you create a calculated field that automates the process of mapping users to data values. This method requires that the underlying data include the security information you want to use for filtering. For example, using a calculated field, the
USERNAME() function, and a “Manager” column in the data source, you could determine if the user requesting the view is a manager and adjust the data in the view accordingly.

Because filtering is defined at the data level and automated by the calculated field, this method is less error prone than mapping users to data values manually. When you publish an asset with this type of user filter, you need to set permissions so that users cannot save or download it and remove the filter, thereby gaining access to all of the data.

For more information, see Create a dynamic filter using a security field in the data in the Tableau Desktop and Web Authoring help.

Use a data policy

Starting in Tableau 2021.4, when Data Management is enabled in Tableau Server or Tableau Online, users with a Creator license can implement row-level security through data policies on virtual connections. Because virtual connections are centralized and reusable, you can manage row-level security for each connection in one place, safely and securely, across all content that uses that connection.

Unlike the above solutions for row-level security in Tableau, this method doesn't carry the same risk of exposing information if an author neglects to properly secure permissions on the workbook or data source, because the policy is enforced on the server for every query.

Row-level security through virtual connection data policies was developed to address shortcomings of other row-level security solutions. We recommend this solution in most situations where it’s an option.

For more information on row-level security using data policies on virtual connections, see About Virtual Connections and Data Policies.

Use existing RLS in the database

Many data sources have mechanisms for RLS built in. If your organization has already put effort into building row-level security in a data source, you may be able to take advantage of your existing RLS.
It is not necessarily easier or better to implement a built-in RLS model vs. building it with Tableau in mind; these techniques are generally leveraged when an organization has already invested in these technologies and they want to take advantage of that investment, or when they need to apply the same security policies to other database clients in addition to Tableau.

The main benefit of using built-in RLS is that administrators can implement and control their data security policy in one place: their databases.

**Row-level security option comparison**

<table>
<thead>
<tr>
<th>RLS option</th>
<th>Useful when</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual user filter</td>
<td>• You are doing a proof of concept or testing user filtering functionality</td>
<td>• Simple at small scales</td>
<td>• High-maintenance</td>
</tr>
<tr>
<td></td>
<td>• You are creating a static workbook to use with an unchanging group of users</td>
<td>• Easy to understand mapping</td>
<td>• Need to update filter and republish as user base changes</td>
</tr>
<tr>
<td></td>
<td>• You understand the data security risk of having the permissions set incorrectly</td>
<td>• Good for testing</td>
<td>• Permissions must be secured to prevent users from seeing unfiltered data</td>
</tr>
<tr>
<td>Dynamic user filter</td>
<td>• You don’t have a Data Management license</td>
<td>• Relatively easy to set up</td>
<td>• Must be replicated in every workbook</td>
</tr>
<tr>
<td></td>
<td>• The data contains information you can use to filter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Manual user filter and Dynamic user filter are not available in Tableau Desktop.
## Configure Connections with Analytics Extensions

Analytics extensions allow you to extend Tableau dynamic calculations in a workbook with languages like R and Python, with Einstein Discovery, and with other tools and platforms.

<table>
<thead>
<tr>
<th>Data policy</th>
<th>Data policy items</th>
<th>Data policy conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have a Data Management license</td>
<td>Centralized</td>
<td>Data Management license required</td>
</tr>
<tr>
<td>The data contains information you can use to filter it</td>
<td>Secure</td>
<td></td>
</tr>
<tr>
<td>Ease of data security is a significant concern</td>
<td>Low-maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Responsibilities for security and analytics can be separated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RLS in the database</th>
<th>RLS in the database items</th>
<th>RLS in the database conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your database has an existing RLS security built into the database</td>
<td>Might already be built into your organization’s database</td>
<td>Must use live queries</td>
</tr>
<tr>
<td>You aren’t using extracts</td>
<td>Policies can be applied to database clients other than Tableau</td>
<td>Might have limitations or requirements. Your IT team can identify them.</td>
</tr>
</tbody>
</table>
These settings endpoints enable you to configure analytics extensions on your site in Tableau Online. For more information, see Analytics Extensions API.

For more information about user scenarios and configuring analytics connections in Tableau Desktop or for web authoring, see Pass Expressions with Analytics Extensions, in the Tableau Desktop and Web Authoring Help.

Note: Beginning in June 2021, you can create multiple analytics extensions connections for a site, including multiple connection for the same type of extension (you are presently limited to a single Einstein Discovery analytics extension for each site). For details, see What’s New in Tableau Online.

This topic describes how to configure sites on Tableau Online with analytics extensions.

Security requirements and configuration

For increased security, Tableau Online requires an encrypted channel and authenticated access to the external services used for analytics extensions.

Certificate

The server running the external service for analytics extensions must be configured with a valid TLS/SSL certificate from a trusted 3rd party certificate authority (CA). Tableau Online will not establish a connection with external servers that are configured with a self-signed certificate, a certificate from a private PKI, or a certificate that is not trusted by an established 3rd party CA.

Safelist firewall configuration

Many organizations deploy a firewall that requires safelist exceptions for known hosts outside the network. In this scenario, you will need to specify two Tableau Online IP addresses as exceptions. The Tableau Online IP addresses used for connections to analytics extensions servers are 44.224.205.196 and 44.230.200.109.
Configure analytics extensions settings

1. Sign in to Tableau Online as a site administrator.
2. Click Settings.
3. On the Settings page, click the Extensions tab and then scroll to Analytics Extensions.
4. Select Enable analytics extensions for site.
5. Click Create new connection.
6. In the New Connection dialog, click the connection type you want to add, then enter the configuration settings for your analytics service:

   Select a connection type

   Click a connection type below.

   - TabPy
     Integrate Python into Tableau calculations using TabPy, Tableau’s Python server.

   - Einstein Discovery
     Augment your analysis with Einstein Discovery predictions.

   - Rserve
     Integrate R into Tableau calculations using Rserve, an open source R server.

   - Analytics Extensions API
     Extend Tableau calculations to dynamically include external analytics tools and platforms.

3. The options you need to configure depend on the connection type you choose:
• For an Einstein Discovery connection, click **Enable**.
• For TabPy, RServer and Analytics Extensions API connections, enter the following information:
  • **Connection Name**: (Required) Specify the server type you are connecting to. RSERVE supports connections to R using the RServe package. TABPY supports connections to Python using TabPy, or to other analytics extensions.
  • **Require SSL** (Recommended): Select this option to encrypt the connection to the analytics service. If you specify a HTTPS URL in the **Hostname** field, then you must select this option.
  • **Hostname**: (Required) Specify the computer name or URL where the analytics service is running. This field is case sensitive.
  • **Port**: (Required) Specify the port for the service.
  • **Sign in with a username and password** (Recommended): Select this option to specify user name and password that is used to authenticate to the analytics service.

7. Click **Save**.

**Edit or delete an analytics extension connection**

To edit or delete a configuration, navigate to **Analytics Extensions** on the **Extensions** tab of your site.

Click the **Edit** or **Delete** icon and follow the prompts to change the configuration.
Script errors

Tableau cannot verify that workbooks that use an analytics extension will render properly on Tableau Online. There might be scenarios where a required statistical library is available on a user’s computer but not on the analytics extension instance that Tableau Online is using.

A warning will be displayed when you publish a workbook if it contains views that use an analytics extension.

Use Certification to Help Users Find Trusted Data

In a self-service environment with multiple publishers, it’s common for a project on Tableau Online to contain a variety of content that is named similarly, or is based on the same or similar underlying data, or is published without any descriptive information about it. When this is the case, analysts might lack confidence about the data they should use.

To help your users find the data that’s trusted and recommended for their type of analysis, you can certify the data that complies with your organization’s data standards.

In addition to certifying published data sources, if you have a Data Management license for Tableau Server or Tableau Online:

- Starting in Tableau 2019.3, if Tableau Catalog is enabled, you can certify databases and tables that are associated with your Tableau content. (For more information about Tableau Catalog, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.)
- Starting in Tableau 2022.1, you can certify virtual connections and virtual connection tables.
How certification helps users find trusted data

When you certify an asset, users see a green badge or green check mark, depending on where the asset is being viewed.

Certified data sources rank higher in search results and are added to recommended data sources.

In addition, you can provide notes about the certification status, which appear when users click the badge, or in a tooltip when they hover over the data source icon in web authoring or Tableau Desktop. The information also shows who certified the data source.

For more information, see the How to certify data steps below.
Create guidelines for selecting data to certify

As with most Tableau functionality, certification is flexible. You can define for your organization the criteria you use to determine when to certify a data source (or database or table). As you do this, you might want to document and share your guidelines. As new data sources are published, the guidelines can help you and other administrators or project leaders to be consistent with your certification choices. They can also help users understand what certification means.

Whether you use the same certification criteria across all projects, or define unique criteria for each project, the important thing is to be clear about what certification means in your environment.

Who can certify data

To certify a data source, you must

- be a Server or Site Administrator, or
- have a site role of Explorer (Can Publish) or Creator and be the project owner or have the Project Leader capability for the project containing the data you want to certify.

To certify virtual connections and virtual connection tables, you must have a Data Management license in your environment, and you must

- be a Server or Site Administrator, or
- have a site role of Explorer (Can Publish) or Creator and be the project owner or have the Project Leader capability for the project containing the data you want to certify.

To certify databases or tables, you must have Tableau Catalog enabled in your environment, and you must

- be a Server or Site Administrator, or
- have the Set permissions capability on the database to certify that database or any tables within that database.
How to certify data

The data you can certify depends on whether you have a Data Management license, and if you do, if you have Tableau Catalog enabled in your environment.

- All users with the right permissions can certify data sources.
- If you have a Data Management license, users with the right permissions can also certify virtual connections and virtual connection tables.
- If Tableau Catalog is enabled, users with the right permissions can also certify databases, tables, and files.

Take the following steps to certify the data.

1. Sign in to Tableau Online.
2. This step depends on the type of asset you want to certify:
   - Data source or virtual connection - on the Explore page, select All Data Sources or All Virtual Connections.
   - Virtual connection table - on the Explore page, select All Virtual Connections, and select the virtual connection that contains the virtual connection table you want to certify. Then select the virtual connection table.
   - Database or table - on the External Assets page, select Databases and Files or Tables.
3. On the page, select the More actions menu (...) next to the asset name you want to certify.
4. Select Edit Certification and then do the following:
   - Select the This data is certified check box.
   - Add a note that gives users context for the certification status, intended use for the data, or other helpful information, and then click Save.
Information you add to the Note section appears in the certification badge or tooltip, mentioned earlier in How certification helps users find trusted data.

Notify Owners When Extract Refreshes Fail

A scheduled extract refresh can fail to complete for a variety of reasons, such as outdated embedded credentials or file path. For scheduled refreshes that run directly from Tableau Online, after a refresh has failed five consecutive times, Tableau Online suspends the schedule until a site admin or the data source owner takes an action to address the cause.

A site admin can enable Tableau Online to send email to the owner of a data source when its scheduled extract refresh does not complete successfully. The data source owner can then opt out individually in their account settings.

The email contains the following information:

- Extract or workbook name.
- The date and time of the last successful refresh. Or, if the last refresh was longer than 14 days ago, the email shows “not in the last N days.”
- The number of consecutive times the refresh has failed.
- A suggested action to take to address the cause of the failure, such as updating embedded credentials or a file path, and a link to Tableau Online to take the action.

When receiving email about data sources refreshed by Tableau Bridge, there will be some differences. For more information, see Differences for Tableau Bridge refreshes later in this topic.

Enable refresh failure emails

As a site admin, you have the ability to enable (or disable) refresh failure emails for your site using the procedure below. If you opt in, each user can potentially opt out from receiving refresh failure emails from his or her individual account.
1. Sign in to Tableau Online as a site admin and click **Settings**.

2. Under **Manage Notifications**, select or clear the **Flow runs** and **Extract jobs** check boxes under the **On Tableau** and **Email** columns.

**Differences for Tableau Bridge refreshes**

For data sources that are refreshed through Tableau Bridge, notifications will vary. For more information, see Manage Email Alerts for Bridge.

**Refresh Data on Tableau Online**

You can manually refresh data, as well as schedule data refreshes.

**Schedule Refreshes on Tableau Online**

You can schedule refresh tasks directly on Tableau Online for extracts of cloud-hosted data. This can include extracts of the following types of data:

- Salesforce.com or Google Analytics.
- Google BigQuery or Amazon Redshift, if you do not want to use a live connection. For on-premises Redshift, you must use Tableau Bridge.
- SQL-based or other data hosted on cloud platforms, such as Amazon RDS, Microsoft Azure, or Google Cloud Platform, if you do not want to use a live connection, or if live connection isn’t supported for that data source.

For a list of supported data sources, see Allow Direct Connections to Data Hosted on a Cloud Platform.

Schedules are also available when creating extract refresh with Tableau Bridge. For more information see, Set Up a Bridge Refresh Schedule.

**Notes:**
Tableau Online Help

- When a refresh is performed on extracts created in Tableau 10.4 and earlier (that is, a .tde extract), the extract is upgraded to a .hyper extract automatically. While there are many benefits of upgrading to a .hyper extract, you won’t be able to open the extract with earlier versions of Tableau Desktop. For more information, see Extract Upgrade to .hyper Format.
- For information about refreshing extracts of Microsoft Excel, SQL Server or other data Tableau Online cannot reach directly, see Connectivity with Bridge.

- Your Tableau Online site comes with capacity to support all your users’ analytic needs. A site’s capacity includes capacity for storage and tasks that need to be performed on the site includes extracts. For more information, see Tableau Online Site Capacity.

Create a refresh schedule

Important!

- Run Now option is no longer available in Create an Extract Refresh dialog box. Run Now option is now listed in the Actions drop down menu.
- You cannot configure tasks to run sequentially (aka serially). Instead, you might want to stagger your start time for the extract refreshes, so the tasks run one after the other.
- If you migrate your existing tasks to custom schedules, please note that unless you change your start times for these tasks, they will run in parallel, which may not be desired.

1. When you’re signed in to Tableau Online, select Explore from the left navigation pane, and then, depending on the type of content you want to refresh, select All Workbooks or All Data Sources from the drop-down menu.

2. Select the check box for the workbook or data source you want to refresh, and then select Actions > Refresh Extracts.

3. In the Refresh Extracts dialog, select Schedule a Refresh, and complete the following steps:
- **Refresh Type**: Select the type of refresh you want. A full refresh is performed by default. Incremental refresh is available only if you configured for it in Tableau Desktop before publishing the extract. If you select one of more workbook or data source that has been set to do full refreshes, then the option to select incremental refresh is disabled. For more information, see Refreshing Extracts in the Tableau Help.

- **Refresh Frequency**: Setup the frequency for the extract refreshes to run. You can set the frequency to run hourly, daily, weekly or monthly. The time and
day intervals depend on the repeat frequency that you select as described below:

- **Hourly**: The available frequency is every hour from a specific time to a specific time. This means that the task will run every hour during the specified time.

- **Daily**: The available frequencies are every two, four, six, eight, or twelve hours, or just once a day. You can also choose one or more days of the week, in addition to start and end times. This means you can run a task on all or certain days of the week at specific hourly intervals or once a day.

- **Weekly**: The available frequency is one or more days of the week at a specific time. This means you can run the task on certain days of the week, once a week at a certain time.

- **Monthly**: You can set this up in two different ways:
  
  1. You can select **Day** as the frequency interval which then allows you to select specific dates of the month. For example you can select the task to run on the 2nd, 15th and 28th of every month at 2:45 pm.

  2. You can also choose the first, second, third, fourth, fifth, and the last day of the week at a specific time. For example you can choose to run the task every second Wednesday of the month at 2:45 pm.

**Update an Existing Schedule**

When making changes to an existing schedule, you will no longer choose from a list of existing schedules, but directly change the recurrence in the schedule.
**Time limit for extract refreshes**

To ensure that long running refresh tasks don't take up all system resources and don't prevent refreshes of other extracts on your site, Tableau Online enforces a time limit, also known as a timeout limit, of 7200 seconds (120 minutes or two hours) for refresh tasks. The timeout limit is the longest allowable time for a single extract to complete a refresh before it's canceled. The timeout limit is not configurable.

**Staying within the timeout limit**

Although reaching the timeout limit is not common, if you’re working in an extract-heavy environment, there are few modifications you can make to your extracts to help avoid reaching the timeout limit.

- Upgrade extracts to the .hyper format
- Set up incremental refreshes
- Decrease the size of extracts
- Use an alternative method for refreshing extracts
- Schedule refreshes at a different time

**Upgrade extracts to the .hyper format**

Beginning with Tableau 10.5, the format of new extracts changed from .tde to .hyper. Along with a number of optimizations, refreshing large extracts in the .hyper format can be faster. If you’re working with .tde extracts, consider upgrading your .tde extracts to the .hyper format. For more information, see Extract Upgrade to .hyper Format.

**Set up incremental refreshes**

Consider configuring your extracts to be incrementally refreshed instead of fully refreshed each time a refresh task is performed.
By default, extracts are set up to fully refresh. Although a full refresh gives you an exact copy of the data, a full refresh can take a long time to complete. To reduce the time it takes to refresh an extract, consider setting up incremental refreshes of your extracts instead. For more information, see Configure an incremental extract refresh in the Tableau Help.

**Note:** You must set up the incremental refresh before publishing the extract to Tableau Online. After publishing, you will then be able to select Incremental Refresh option in the Create Extract Refresh dialog.

Decrease the size of extracts

You can help refresh tasks complete faster by decreasing the size of your extracts.

There are two common methods for decreasing the size of extracts: hide all unused fields and use data source filters.

- **Hide all unused fields:** Fields that you hide in your data source are excluded when the extract is created. To hide fields while creating the extract, see Create an extract in the Tableau Help.

- **Add data source filters:** You can reduce the number of rows in your extract by adding a data source filter. For more information, see Filter Data from Data Sources in the Tableau Help.

**Note:** You must hide all unused fields or add data source filters before publishing the extract to Tableau Online.

Use an alternative method for refreshing extracts

If possible, consider refreshing your extracts outside of Tableau Online.
• **Tableau Desktop**: You can manually refresh published extracts from Tableau Desktop. For more information, see Refresh Published Extracts from Tableau Desktop.

• **Tableau Bridge**: Depending on the data source, you can use Tableau Bridge to set up and refresh published extracts on a schedule. For more information, see Use Bridge to Keep Data Fresh.

• **Tableau Data Extract Command-Line utility**: Depending on the data source, you can use the command-line utility that comes with Tableau Desktop to programmatically refresh published extracts. For more information, see Automate Extract Refresh Tasks from the Command Line.

Schedule refreshes at a different time

Consider changing when the refresh tasks occur. For more information, see Manage Refresh Tasks.

Errors when refresh tasks reach timeout limit

If a refresh task reaches the timeout limit, you or others might see one of the errors listed below. If you published the extract or are the extract owner, you might see one of these errors in an email notification. If you’re a site administrator, you might see one of these errors in the administrative view about Background Tasks for Extracts.

  • *The query time resource limit (7200 seconds) was exceeded.*
  • `com.tableau.nativeapi.dll.TableauCancelException: Operation cancelled.`
  • *The query time resource limit (8100 seconds) was exceeded.*

To help resolve and avoid these errors in the future, see the section above, Staying within the timeout limit.

**Refresh Data Using Saved Credentials**

To keep data fresh for Salesforce, Google Analytics, Google BigQuery, OneDrive, Dropbox, Quickbooks Online, Anaplan, Oracle Eloqua, and ServiceNow ITSM, you must do the
Embed credentials into the data connection. The steps are described in this topic.

1. If your data source or workbook contains an extract, you can add the extract to a refresh schedule. For the steps to schedule a refresh, see Schedule Refreshes on Tableau Online.

2. If your data source or workbook contains a direct (live) connection to the data, then the data is always fresh, and you don't need to create a scheduled task to refresh it.

Embed credentials into the data connection

You can embed credentials for your connection by following these steps.

1. Sign in to Tableau Online and navigate to Data Sources page.

2. Select the data source with the connection you want to refresh, and on the Actions menu, select Edit Connection.

3. The options in the Edit Connection dialog box will vary depending on the data source you selected. Review the options available to you and select the one that meets your needs.

   If you select Prompt user for <connector name> credentials, you will need to refresh data manually. You can do this by asking users to republish the data source from Tableau Desktop or by initiating a refresh task on Tableau Online.

Connector-specific credential information

Use OAuth credentials

Secure data connections are made using OAuth access tokens for data connections to Google Analytics, Google BigQuery, Google Sheets, OneDrive, Dropbox, Salesforce, and QuickBooks Online. You create access tokens by signing in to the data from Tableau Online and approving Tableau Online access to the data as long as the credentials exist (or you
manually revoke access). When you add a new account, the sign-in page appears. When you sign in, you create a new access token for the credentials you submit.

**Note:** Dropbox uses OAuth credentials, however Tableau doesn’t currently support authenticating to Dropbox using a Google account.

You can embed shared credentials, as you might do if you use a dedicated database account for a group of users. Or you can embed an individual user’s credentials. The account you use to create the access token must allow a level of access for running the refresh task.

**Use other credentials**

Anaplan, Oracle Eloqua, and ServiceNow ITSM each support using saved credentials (for example, user name and password) to connect to the data.

**Use Salesforce security tokens**

If you embed standard Salesforce credentials, Salesforce might require a security token for you to access a data. For example, if you want to access the Salesforce connection from an IP address that is not included in your organization’s trusted IP list. This security token must be appended to the password used in the data connection.

The security token can expire. When Tableau is unable to refresh a Salesforce connection because the security token has expired, Tableau displays an alert to the following users:

- Authors of the relevant workbooks and data sources.
- Authors of workbooks that connect to the relevant data sources.
- Site administrators.

You can renew an expired security token by editing the data connection on the server.

For more information about Salesforce authentication and security tokens see Security and the API in the Salesforce.com SOAP API Developer’s Guide.
Start a Refresh Task Manually

You can refresh extracts of data hosted with most cloud data providers directly on Tableau Online. You can run a refresh from Tableau Bridge for data sources you’ve set up there.

If a data source has scheduled refreshes, running a manual refresh does not affect the schedule.

Before you start a refresh task

When an extract refresh is performed on extracts created in Tableau 10.4 and earlier (that is, a .tde extract), the extract is upgraded to .hyper extract automatically. While there are many benefits of upgrading to a .hyper extract, you will be unable to open the extract with previous versions of Tableau Desktop. For more information, see What’s new to extracts.

Run a refresh on Tableau Online

1. Sign in to the Tableau Online site to which the data source is published.

2. On the Data Sources page, select the More actions icon (…) next to the data source you want to refresh, and then select Refresh Extracts from the menu.
3. Under **Refresh Now**, select **Full Refresh**.

**Note:** For data sources that have scheduled refreshes, site administrators can initiate a refresh also from the **Actions** menu on the **Tasks > Extract Refreshes** page.

**Run a refresh in the Tableau Bridge client**

- Open Tableau Bridge from the Windows system tray, and select the **Run now** icon (○) for the data source.
Note: When an extract refresh is performed on extracts created in Tableau 10.4 and earlier (that is, a .tde extract), the extract is upgraded to .hyper extract automatically. While there are many benefits of upgrading to a .hyper extract, you won’t be able open the extract with earlier versions of Tableau Desktop. For more information, see Extract Upgrade to .hyper Format.

Manage Refresh Tasks

Administrators can manually refresh extracts or delete their schedules.

1. Sign in to the site that has the schedules you want to manage, and then click Tasks.

2. Select one or more scheduled extract refreshes.

3. From the Actions menu, do any of the following:
   - Select Change Schedule, and choose a new schedule from the list.
   - Select Run Now to refresh manually.
     
     Note: If an extract does not have a scheduled refresh, you can refresh it on demand from the Data Connections page.
   - Select Delete to completely remove the schedule for the selected data sources.

See also

Notify Owners When Extract Refreshes Fail

Automatically Suspend Extract Refreshes for Inactive Workbooks

To save resources, Tableau can automatically suspend extract refresh tasks for inactive workbooks. This feature applies to full extract refreshes only, not to incremental extract refreshes. This feature only applies to refresh tasks that run more frequently than weekly, not
to weekly or less frequent refresh tasks. This feature only applies to extracts that are embed-
ded in workbooks and not to published data sources.

If any of these events occur, the workbook inactivity countdown timer is reset.

- Viewing the workbook sheets
- Having any data-driven alert or subscription set-up on the workbook
- Downloading the workbook
- Moving the workbook's location or changing the owner

This feature is only configurable on Tableau Server. On Tableau Online, this feature is not
configurable and the number of days that a workbook can be inactive before extract refresh
tasks are suspended is 32 days.

Notifications

An email notification is sent three days before the extract refresh schedule is suspended.

Another email notification is sent when the extract refresh schedule is suspended.

Resume suspended extract refreshes

Suspended extract refreshes won't resume automatically if someone uses the workbook. It
must be done manually.

To view and resume extract refreshes that were suspended:

1. Sign into the site and click **Tasks**.
2. Click the **Extract Refreshes** tab.
3. Select one or more items.
4. From the **Actions** menu, select **Resume**.

**Use Tableau Bridge**

**Get Started**
- Use Bridge to Keep Data Fresh
- Install Bridge
- Set Up a Bridge Refresh Schedule
- Use Bridge for Private Cloud Data

Quick Reference for Site Admins

- About the Bridge Client
- Configure the Bridge Client Pool
- Manage the Bridge Client Pool
- Change the Bridge Client Settings

Quick Reference for Publishers

- Publish a Bridge Data Source with a Live Connection
- Stop Keeping Data Fresh Through Bridge
- Manage Email Alerts for Bridge
- Troubleshoot Issues with Bridge
Use Bridge to Keep Data Fresh

For data sources or virtual connections data that Tableau Online can't reach directly, you can use Tableau Bridge to keep data fresh. For example, use Bridge when your data source connects to data hosted behind a firewall.

**Note:** If a data source connects to underlying data hosted in the cloud accessible from the public internet, live and extract connections run from Tableau Online directly.
What is Bridge

Tableau Bridge is client software that runs on a machine in your network. The client works in conjunction with Tableau Online to keep data sources that connect to private network data, which Tableau Online can’t reach directly, up to date. Private network data includes on-premises data and virtual cloud data.

How does it work

Tableau Bridge functions like a conduit between private network data, such as Excel files and SQL Server data, and Tableau Online. The client communicates with Tableau Online through an outbound encrypted connection to enable connectivity between data behind a firewall and your Tableau Online site.

For more information about how Bridge communicates with Tableau Online, see Tableau Bridge Security.

Who can use it

Although any authorized user of Tableau Online can use Bridge, Bridge is optimized for users that perform the following functions in an organization: site admins and data source owners.

Site admins, or users who have the Site Administrator or Site Administrator Creator role on Tableau Online, install and manage Bridge clients. For more information, see Plan Your Bridge Deployment.
**Content owners**, or users who have the Creator or Explorer (can publish) role on Tableau Online, typically publish and manage their own content. Content owners use Bridge to facilitate the live and extract connections between Tableau Online and private network data.

- **For live connections**, Bridge is detected automatically as part of the data source or virtual connection publishing process. Support for live connections are enabled through pooling.

  **More about data sources**: Users see the option to publish the data source with a live connection during the publishing process. This option is available when live connections are supported for relational or cloud databases accessible only from inside the network.

  After the user publishes the data source, an available client in the pool facilitates the live queries. That’s all there is to it.

  To get started, users publish a data source to Tableau Online, and select the option to maintain a live connection. Or, publish a workbook, and select the option to publish the data source separately, and then specify a live connection. For more information about publishing data sources, see **Publish a Bridge Data Source with a Live Connection**.

  **Note**: If publishing a data source that connects to a private cloud database, follow the steps described at **Publish private cloud-based data sources** to ensure Bridge is used to facilitate the data freshness tasks.

- **For extract connections**, users can set up refresh schedules for data sources or virtual connections.

  **More about data sources**: Users need to publish the data source separately, whether he or she goes through the publishing data source or workbook process. For more information, see **Set Up a Bridge Refresh Schedule**.
**Install Bridge**

Tableau Bridge is software that you can install and use in conjunction with Tableau Online. Always install the latest version of Bridge to take advantage of the latest security and feature updates.

**Before installing Bridge**

Before you install the Bridge client, review the minimum requirements and general information that you need to know to help ensure a successful start to using Bridge.

**System recommendations**

Bridge is available for the Windows operating system. You can also install the client on a virtual machine. For more information about which versions of Windows are supported and other recommendations, review the Recommended software and hardware.

**License requirements**

You do not need a product key to use Bridge. Use of Bridge is subject to your End User License Agreement (EULA). Users of Bridge must be authorized users of Tableau Online.

**Network access**

Because Bridge facilitates connections between your private network data and Tableau Online, it requires the ability to make outbound connections through the internet. Bridge does not require the ability to make inbound connections, which means that it typically does not require a network administrator to make firewall or network changes to work.

**Required ports**

Tableau Bridge uses port 443 to make outbound internet requests to Tableau Online and port 80 for certificate validation.
Tableau with MFA

If multi-factor authentication (MFA) is enabled with Tableau authentication, Bridge clients must be running Tableau Bridge version 2021.1 and later. For more information about Tableau with MFA, see About multi-factor authentication and Tableau Online.

Database drivers

Bridge uses Tableau connectors to connect to different databases to maintain data freshness. Some of those connectors require drivers to communicate with the databases.

By default, the following drivers are installed with the client:

- Oracle (OCI)
- Microsoft SQL Server
- PostgreSQL

To get drivers for other connectors that the client supports, go to the Driver Download page on the Tableau website. Make sure to filter the list on the Windows operating system and use the instructions listed for the latest version of Tableau Desktop.

Install Bridge

Follow the procedure below to install a Bridge client. You do not need a Tableau product key to install or use the client.

1. Download the installer from the Product Downloads and Release Notes page on the Tableau website. We recommend downloading the latest version listed on the page to take advantage of the latest security and feature updates.

2. Run the installer. You can install the client using a shared Windows service account.

3. When prompted, accept the license agreement to continue.

4. (Optional) Customize the installation by clicking Customize. You can change any of the following options:
Tableau Online Help

- **Install location:** You can specify a different location to install the client.
- **Create a desktop shortcut:** Clear the check box if you don't want to automatically create a desktop shortcut for Bridge.
- **Create a Start menu shortcut:** Clear the check box if you don't want to automatically add a shortcut for Bridge to the Start menu.
- **Enable error reporting:** If Bridge has a problem and closes unexpectedly, crash dump files and logs are generated and sent to Tableau. To turn off this option, clear this check box during installation. You can also turn this option off (or back on) in the client after installation. For more information, see Error reports.
- **Install database drivers:** Clear the check box if you don't want to automatically install the default database drivers.

5. Click **Install** to begin the client installation.

After the client is installed, you can start the client by double-clicking the Bridge shortcut on your desktop or from Tableau Desktop (if it's installed on the same machine as Bridge).

**About My Tableau Bridge Repository**

As part of the Bridge installation, a folder called **My Tableau Bridge Repository** is created on the machine where the client is installed. This repository folder contains critical sub-folders, such as **Logs** and **Configuration**, that Bridge needs in order to operate properly.

The repository folder is created under the Documents folder: \Users\<user>\Documents\My Tableau Bridge Repository.

**Important:** We strongly recommend that you do not change the folder that Bridge uses as its repository.

**Upgrade Bridge**

Staying in sync with the latest version of Bridge ensures that you can take advantage of the latest features and fixes included with each new version of the Bridge client.

To upgrade the client, follow the procedure below.

**Important:**
If multi-factor authentication (MFA) is enabled with Tableau authentication, Bridge clients must be running Tableau Bridge version 2021.1 and later. For more information about Tableau with MFA, see About multi-factor authentication and Tableau Online.

- Check out Existing Bridge deployment for information about the latest release.

1. Log on to the machine where the client is installed.

2. If you’re running the client in Service mode, in the lower-left corner of the client, next to Mode, select **Application**. Changing to Application mode ensures that the Tableau Bridge service stops completely before the upgrade.

3. Select **Settings > Exit**.

4. Follow the steps listed in the Install Bridge section to install the client and complete the upgrade.

After installation is complete, the client will start as normal. If the client was running in Service mode prior to the upgrade process, switch back to Service mode.

**Error reports**

You can help improve Bridge by automatically sending error reports to Tableau. Error reports are comprised of crash dump files that are sent to Tableau when the Bridge client has to close unexpectedly (crash). These files are used by Tableau to identify and address issues that can cause the client to close unexpectedly.

**Important:** Turn off this option if your data is subject to any privacy regulations.

**What's in an error report**

The encrypted package is made up of the following files: crash/core dump files and manifest files related to the crash.

The files can contain data that include:
Tableau Online Help

- Machine-specific information. For example: hardware, operating system, domain, etc.

- Snapshot of the memory contents at the time of the crash. For example: which data sources had extracts refreshed, which data sources had live queries, etc.

- Information that Bridge was processing at the time of crash, including customer-identifiable information that might be used to correct the error. For example: who is using Bridge with which site, the name of the client that the user is signed in to, etc.

For more information about how Tableau treats sensitive information, see the Tableau privacy policy on the Tableau website.

Configure automatic error reporting

You can configure Bridge to send error reports automatically in one of two places: during the client installation process or after installation directly in the client.

Enable the automatic error reporting option during client installation

During installation, the option to automatically send error reports from the client is selected by default. However, you can remove the selection.
Disable the automatic error reporting option in the client

If you decided to use the default setting during the installation process and decide later on that you don’t want to allow error reports to be sent automatically, you can modify the option from the client menu.

Install Bridge from the command line

You can install the Bridge client from command line if you’re a local administrator on the machine.
General command line syntax

The syntax for running the Bridge installer from the command line is the following:

```
tableauBridge<installer_name>.exe /option1 /option2

PROPERTY1 PROPERTY2
```

A few notes about the syntax:

- The `tableau<installer_name>.exe` file is the client installer for the product and version you’re installing.
- The options specify how the installation process should run. For example, whether it should display output while installing and whether it should create log files.
- The properties settings specify configuration settings that the installer should make during the installation process.

Example installer command

The following example shows an installer command with some options and property settings.

```
tableauBridge-64bit-2018-2-0.exe /quiet /passive

ACCEPTEULA=1 DATABASEDRIVERS=1
```

You must run the command from the directory where the .exe file is located or specify a full path to the location of the .exe file on the machine. Do not run the installer from a shared directory on your network. Instead, download the .exe file to a directory on the machine where you want to install the client.

Installer options and properties

You can specify one or more options in the command line for the installer.

Installer options

A couple of notes about the options:

- Each option is prefixed with a slash (/).
- Options must come before properties.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>quiet</td>
<td>Run the installer without messages (status or installation progress) and without requiring user interaction. The client doesn't launch after installation is complete.</td>
</tr>
<tr>
<td>passive</td>
<td>Run the installer and display dialog boxes and installation status. Does not prompt the user for input. The client launches after installation is complete.</td>
</tr>
<tr>
<td>norestart</td>
<td>Suppress any attempts to restart. By default, the installer will prompt you before restart unless you run the installer in quiet mode.</td>
</tr>
<tr>
<td>log &quot;log-file.txt&quot;</td>
<td>Log installation information to the specified path and file. Specify the path and file name, such as /log &quot;c:-logs\logfile.txt&quot;. The default log file is the system %TEMP% directory.</td>
</tr>
<tr>
<td>repair</td>
<td>Run the installer to repair an existing installation of Bridge.</td>
</tr>
<tr>
<td>h</td>
<td>Help—lists options and properties for the installer.</td>
</tr>
</tbody>
</table>

**Installer properties**

You can also include one or more properties in the command line for the installer.

Some notes about the properties:

- All of these properties can be used for the initial installation of client. They can't be used to update any settings after initial installation.
- Property names are case sensitive.
- There are no spaces on either side of the equal sign.
- Each property set is delimited with a space.
- Properties must go after options.

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCEPTEULA</td>
<td>Accept the End User</td>
<td>1=Accept</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Value</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>License</td>
<td>Agreement (EULA). If you don't set this option to 1, Bridge cannot be installed using quiet mode.</td>
<td>0=Don't accept (default)</td>
</tr>
<tr>
<td>CRASHDUMP</td>
<td>You can set this option to &quot;1&quot; to help improve Bridge by sending error reports to Tableau automatically when the client crashes. For more information, see Error reports.</td>
<td>1=Yes (default) 0=No</td>
</tr>
<tr>
<td>DATABASEDRIVERS</td>
<td>Install the default set of database drivers that you might connect to from Tableau Bridge. For more information, see Database drivers. To download other database drivers, see the Driver Download page on the Tableau website. You must distribute other drivers using whatever asset management tools you use for software deployment in your organization.</td>
<td>1=Yes (default) 0=No</td>
</tr>
<tr>
<td>DESKTOPSHORTCUT</td>
<td>Create a desktop shortcut.</td>
<td>1=Yes (default) 0=No</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>DRIVERDIR</td>
<td>Specify an installation directory (other than the default) for the database drivers. This option creates the directory and creates an entry in the HKEY_LOCAL_MACHINE\registry. The default location for drivers is C:\Program Files\Tableau\Drivers.</td>
<td>A path such as D:\Drivers</td>
</tr>
<tr>
<td>DRIVER_MSSQL</td>
<td>Disable the Microsoft SQL Server driver from installing automatically during Tableau Bridge installation.</td>
<td>1=Install (default) 0=Don't install</td>
</tr>
<tr>
<td>DRIVER_POSTGRES</td>
<td>Disable the PostgreSQL driver from installing automatically during Tableau Bridge installation.</td>
<td>1=Install (default) 0=Don't install</td>
</tr>
<tr>
<td>DRIVER_REDSHIFT</td>
<td>Disable the Amazon Redshift driver from installing automatically during Tableau Bridge installation.</td>
<td>1=Install (default) 0=Don't install</td>
</tr>
<tr>
<td>INSTALLDIR</td>
<td>Specify an installation directory other than the default.</td>
<td>A path such as D:\Software\Tableau Bridge.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>SKIPAPPLICATIONLAUNCH</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>You can set this option to &quot;1&quot; to prevent the new application from opening automatically when the installation process is complete. This option applies to manual. This option doesn't apply to quiet installations because Tableau Bridge doesn't open automatically when using that option.</td>
<td></td>
<td>1=Yes 0=No (default)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STARTMENUSHORTCUT</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a Tableau Bridge entry on the Windows Start menu.</td>
<td></td>
<td>1=Yes (default) 0=No</td>
</tr>
</tbody>
</table>
Uninstall Bridge

Although it's not necessary to uninstall previous versions of the Bridge client when installing a newer version, you can uninstall Bridge 2018.2 and later if you no longer need it on your machine.

The primary method for uninstalling the client is through the Windows Control Panel.

Alternatively, you can use the following procedure to uninstall Bridge from the command line.

1. Open the Command Prompt as an administrator.
2. In the location where the .exe was installed, run the following command:

   `tableau<installer_name>.exe /uninstall /quiet`

Set Up a Bridge Refresh Schedule

This topic describes how a Tableau data source owner can set up and update refresh schedules for data sources that connect to private network data. Refresh schedules for data sources that connect to private network data rely on Tableau Bridge. The tasks described in this topic assume Bridge has been set up and is being maintained by your site admin. Exceptions are noted.

This topic does not cover setting up refresh schedules for virtual connections. For more information about virtual connections, see Schedule Extract Refreshes for a Virtual Connection.

Notes:

- Bridge keeps data fresh for published data sources only, i.e., data sources published separately from workbooks. Bridge can't keep data fresh in data sources embedded in workbooks.
- To set up and configure refresh schedules for a private cloud-based data sources, see Use Bridge for Private Cloud Data.
Online schedules versus Bridge (legacy) schedules

For data sources that are set up to use extract connections, Bridge uses refresh schedules to keep data fresh.

There are two types of refresh schedules that you can configure for Bridge to use:

- Refresh schedules in Online
- Bridge (legacy)

  **Note:** Bridge (legacy) schedules do not support refreshes for virtual connections.

The schedule you use can depend on a couple of factors, including the version the original schedule was created and the type of underlying data that the data source connects to. In summary, Online schedules are designed to leave client management tasks to the site admin and enable you to perform all your data source management tasks directly on Tableau Online.

**Version**

Beginning with Bridge 2021.4.3, extract refreshes for file-based data sources can use Online schedules. Online schedules for file-based data sources require at least one Bridge 2021.4.3 (or later) client be set up and added to the client pool by your site admin.

By default, schedules created for file-based data sources that were created prior to Bridge 2021.4.3 use Bridge (legacy) schedules. Bridge (legacy) schedules can be converted to Online schedules.

**Compare schedules**

The following table delineates the primary differences between Online and Bridge (legacy) schedules for keeping private network data fresh.

<table>
<thead>
<tr>
<th>Supported data types</th>
<th>Online Schedule</th>
<th>Bridge (Legacy) Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational data</td>
<td>Relational data</td>
<td></td>
</tr>
<tr>
<td>File data</td>
<td>File data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private cloud data</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Content management</strong></td>
<td>Data source page</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Virtual connection page</td>
<td></td>
</tr>
<tr>
<td><strong>Scheduling</strong></td>
<td>Integrated with Tableau Online schedules</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can be configured to refresh data sources as frequently as 15 and 30 minute increments</td>
<td></td>
</tr>
<tr>
<td><strong>REST API</strong></td>
<td>Run Extract Refresh Now option</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Update Data Source Now option</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not supported</td>
<td></td>
</tr>
</tbody>
</table>

**Manage schedules**

Though the scheduling tasks are exactly the same, there are two primary entry points for setting up a Online schedule for a data source that connects to private network data. The first entry point is during the data source publishing process, from Tableau Desktop. The second entry point is at any time after the data source publishing process.

**Note:** Online schedules that use Bridge support the same scheduling frequency options as Online schedules that do not use Bridge.

Set up a schedule

In most cases, you will set up a schedule as you publish your data source from Tableau Desktop.

1. In Tableau Desktop, create your data source.

2. Select **Server > Publish Data Source** to begin the publishing process. If you haven’t already signed in to Tableau Online, you will be prompted to.

3. In the Publish Data Source to Tableau Online dialog box, configure the various
options for your data source, and then click the **Publish** button. This opens a browser window to Tableau Online.

**Note:** Depending on the data that the data source is connected to or how you've configured the data source, the dialog will default to publishing an extract or will give you the option to publish an extract. If you are provided options, select the option to publish an extract.

4. In the Publishing Complete dialog box, click the **Schedule Extract Refresh** button.

5. In the Create Extract Refresh dialog box, configure a schedule for the refresh. For more information about how to configure the schedule, see Schedule Refreshes on Tableau Online.
6. Click the **Create** button.

Add or update an existing schedule

For whatever reason you are unable to schedule a refresh during the data source publishing process, you can add a new or update a schedule anytime after.

1. Sign in to Tableau Online and navigate to your data source.

2. From the data source page, click the **Extract Refreshes** tab.

3. Do one of the following:
To set up a new schedule, click the **New Extract Refresh** button and configure a schedule for your refresh.

To update an existing schedule, select the check box next to the schedule, click the Actions menu, and then select **Change Frequency** to reconfigure the schedule for the refresh.

4. Click the **Create** button.

**Alternative: Manage Bridge (legacy) schedules**

Optionally, you can use the Bridge (legacy) schedule to keep your data fresh.

**Notes:**

- **Important:** Support for Bridge (legacy) schedules will be removed in a future release. To ensure a smooth transition, we recommend you use Online refresh schedules.

- Bridge (legacy) schedules can only complete successfully if you embed your database credentials in the connection through the Bridge client. For more information, see **Embed or update database credentials for Bridge (legacy).**

- When you use a Bridge (legacy) schedule, the time that shows on the client and the time that shows on Tableau Online correspond to the time zone of the machine from which the client is running.

**Set up a Bridge (legacy) schedule**

Just like with Online schedules workflow, in most cases, you will set up a Bridge (legacy) schedule as you publish your data source from Tableau Desktop.

1. In Tableau Desktop, create your data source.

2. Select **Server > Publish Data Source** to begin the publishing process. If you haven't already signed in to Tableau Online, you will be prompted.

3. In the Publish Data Source to Tableau Online dialog box, configure the various options for your data source, and then click the **Publish** button. This opens a browser window to Tableau Online.
4. In the Publishing Complete dialog box, click the Schedule Extract Refresh button. The Create Extract Refresh dialog box, where you configure the Bridge (legacy) schedule, displays.

5. In the Create Extract Refresh dialog box, follow each step to configure the schedule.

![Create Extract Refresh Dialog](image)

**Notes:**

- **To refresh during a specific time period on selected days:** Select Hourly, specify the time range during the day using the From and To drop-down lists, and then select the days of the week.

  To optimize performance on the server, refresh tasks are distributed within a range of up to five minutes of the time of day you specify. For example, if you set an hourly schedule, the occurrence set to run at 1:00 AM could run any time between 1:00 and 1:05 AM.

- **Full or incremental refresh:** If available, you specify whether you want a full or incremental refresh. By default, Tableau Online runs a full refresh. Incremental refresh is available only if you configured the data source for an
incremental refresh in Tableau Desktop before publishing. For information, see Refreshing Extracts in the Tableau Help.

6. Click the **Create** button.

Add a new or update an existing Bridge (legacy) schedule

If you’re unable to schedule a refresh during the data source publishing process, you can add a new or update a Bridge (legacy) schedule anytime after. New (for sites that have been migrated)

1. Sign in to Tableau Online and navigate to your data source.

2. From the data source page, click the **Extract Refreshes** tab.

3. Do one of the following:

   a. To set up a new Bridge (legacy) schedule, in the data source’s actions menu, select **Schedule with Bridge (Legacy)**, configure the schedule, and then click the **Schedule Refresh** button.

   ![Schedule with Bridge (Legacy) menu](image)

   b. To update an existing Bridge (legacy) schedule, select the check box next to the existing schedule, click the data source’s actions menu, and then select **Change Schedule**. In this workflow, you can't change the client that performs
the refresh. If you need to change the client that performs the refresh, see Change the client that performs the Bridge (legacy) schedule. When finished, click the **Change Schedule** button.

Other Bridge (legacy) schedule management tasks

Add a new or update an existing schedule from the client

If you, not your site admin, are managing the "named" clients, you can add a new or update an existing Bridge (legacy) schedule directly from the Bridge client.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. Hover over the data source and click the **Schedule** icon. This opens a browser window to the data source page in Tableau Online.

3. Repeat steps 2-3 from the above Add a new or update an existing Bridge (legacy) schedule section to set up the schedule.

Add a new computer (client) to perform a scheduled refresh

As part of the scheduling process, in the scheduling dialog, you must specify a machine. The machine you specify is the Bridge client that performs the refresh.

The Bridge (legacy) schedule displays the clients that you signed into.

If the client you want to select is not available from the drop-down list, it can be one of a few reasons:

- You're not signed in to the client.
- The client is not properly registered or connected to the site. Go to and open the client and make sure that it has a green or "Connected" status.
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- Your site admin manages all clients in your organization. When using Bridge (legacy) schedules, the data source owner and the user signed into the client must be the same. If your site admin is signed into the client, he or she must reassign ownership of the data source to him or herself in order to schedule a refresh.

Cancel an in-progress refresh

In some cases, you might need to cancel an in-progress refresh. You can cancel a refresh for a data source that uses the Bridge (legacy) schedule only.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. Click the Cancel Refresh button. This action will cancel the in-progress refresh.

Note: A client can perform one Bridge (legacy) refresh at a time. If you need to run more than one Bridge (legacy) refresh at the same time, discuss with your site admin about setting up additional clients on different machines to perform the extract refreshes.

Change the client that performs the Bridge (legacy) schedule

If you're working with a Bridge (legacy) schedule and want to change the location or machine that performs the refresh, you must set up a new refresh schedule. You can only schedule a refresh using a client that you are signed in to.
To set up a new Bridge (legacy) schedule, see Set up a Bridge (legacy) schedule. When you’re done setting up a new refresh schedule, make sure that you delete the previous schedule identical to the new schedule.

**Important:** If the data source requires database credentials to access the underlying data, you must go back to the client and edit the connection information to re-embed the database credentials. You can use the **Test Connection** option in the client to check whether the data source can access the underlying data.

Remove a client from a site

After you change the client that performs the Bridge (legacy) schedule, consider permanently removing the client from the site if it’s no longer being used for any other data freshness tasks.

1. Sign in to Tableau Online.
2. In the upper-right corner of the browser, click your profile image or initials, and select **My Account Settings**.
3. Under Connected clients, click **Delete** next to the client you want to remove from the site.

Verify a previous or upcoming refresh

You can check when a previous refresh took place or find out when the next refresh will occur.

1. Sign in to Tableau Online and navigate to your data source.
2. From the data source page, click the **Extract Refreshes** tab.
3. Next to the schedule, review **Last update** and **Next** update columns.

Migrate from Bridge (legacy) to Online schedules

Refresh schedules for file-based data sources that were created before Bridge 2021.4.3 use Bridge (legacy) schedules by default. You can migrate Bridge (legacy) schedules to use
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Online schedules to keep your data fresh. Online schedules run on Bridge clients managed by your site admin and take advantage of pools of available clients to perform the refreshes.

When you migrate a Bridge (legacy) schedule to use an Online schedule, the previous schedule is deleted and can't be recovered. If you change your mind after migrating the schedule, you must create the previous schedule using the Bridge (legacy) schedules workflow described in the Set up a Bridge (legacy) schedule section above.

1. Sign in to Tableau Online and navigate to your data source.

2. From the data source page, click the Extract Refreshes tab.

3. Click the New Extract Refresh button.

4. Configure the schedule and click the Create button. The original Bridge (legacy) schedule will be deleted.
Note: Online schedules for file-based data sources require Bridge 2021.4 clients. If no clients have been set up or are available at the time of the scheduled refresh, the refresh will fail.

Delete a refresh schedule

1. Sign in to Tableau Online and navigate to the data source whose refresh schedule you want to delete.
2. On the data source page, click the Extract Refreshes tab.
3. Select the check box next to the schedule you want to delete and select Actions > Delete.

Use Bridge for Private Cloud Data

This topic describes how a data source owner can publish a data source that connects to cloud data, such as Amazon Redshift and Snowflake, that can only be accessed from a private network.

Data sources that connect to private cloud data rely on Tableau Bridge to keep data fresh. In most cases, Tableau Online will automatically detect that Bridge is required as part of the publishing process. However, in some cases, you might need to manually configure your connection to ensure that Bridge is used.

The tasks described in this topic assume Bridge has already been set up and is being maintained by your site admin.

Notes:

- Bridge keeps data fresh for published data sources only, i.e., data sources published separately from workbooks. Bridge can't keep data fresh in data sources embedded in workbooks.
- No additional steps are required to use Bridge when publishing virtual connections that connect to cloud data.
Set up schedules for private cloud-based data sources

Use the following procedure to ensure that Bridge schedules are used to keep extracts of your private cloud-based data sources up to date.

1. Follow steps 1-7 in the Publish a Data Source topic in the Tableau User Help.
2. If not already signed in to Tableau Online, sign in and navigate to your data source.
3. From the data source page, click the Connections tab and select the check box next to the connection.
4. From the Actions drop-down menu next to the connection, select Edit Connection.
5. In the dialog box next to Network type, select the Private Network radio button and click Save.

About switching network types

Changing the network type does not change the network type used by existing schedules for the data source.

If you change the network type for a data source that has an existing schedule associated with it, you must create a new schedule. This also means, if you created a refresh schedule prior to changing the network type, you must delete it before using the Run Now option. For more information about deleting a refresh schedule, see Delete a refresh schedule.
You can proceed to the next step so that a previous Online refresh schedule is automatically deleted when you create a new Bridge-dependent refresh schedule.

6. Follow one of the steps below depending on the schedule you need to configure:

- For an Online refresh (formerly called Recommended) schedule, follow the steps described here: Add or update an existing schedule.

- For a Bridge (legacy) schedule, follow the steps described here: Add a new or update an existing Bridge (legacy) schedule.

**Note:** If you had previously set up a Tableau Online refresh schedule, it will be deleted automatically when you save the Bridge-dependent schedule.

7. Click the **Schedule Refresh** button.

**Publish private cloud-based data sources that use live connections**

Use the following procedure to ensure that Bridge live queries are used to keep private cloud-based data sources up to data.

1. In Tableau Desktop, create your data source.

2. Select **Server > Publish Data Source** to begin the publishing process. If you haven’t already signed in to Tableau Online, you will be prompted to.

3. In the Publish Data Source to Tableau Online dialog box, configure the various options for your data source and ensure you do the following:

   - Under Authentication, click **Edit** and select **Embedded password**.
   - Depending on the data that the data source is connected to or how you’ve configured the data source, the dialog can default to publishing a live connection or give you the option to publish a live connection or extract. If you are provided with options, select **Maintain a live connection**.

4. Click the **Publish** button. This opens a dialog box.

5. In the dialog box, click the **Publish with Bridge** button. This opens a browser
window to Tableau Online.

6. In the Publishing Complete dialog box, click the **Done** button.

7. From the data source page, click the **Connections** tab and select the check box next to the connection.

8. In the dialog box next to Network type, if not selected automatically, select the **Private Network** radio button and click **Save**.

---

Publish OAuth enabled private cloud-based data sources

Tableau Bridge supports OAuth when connecting to private data that uses OAuth and public data that uses OAuth when it’s joined to private data. Bridge currently supports these connectors when using OAuth: Snowflake, Google BigQuery, Google Drive, Salesforce, and OneDrive. For most data sources, live connections and extracted data are supported.
Both saved credentials or managed keychain connectors are supported by OAuth. The type of functionality is dependent on the connector that you use.

1. In Tableau Desktop, connect to your data housed in a private cloud database.
2. Depending on the connector, you may be prompted to choose the authentication type. If you are provided with options, select **Sign in using OAuth**.
3. The **Data Source** page opens so that you can prepare the data for analysis and begin building your view.
4. Choose whether to publish as a live connection or an extract. Some data sources, such as Salesforce, don’t support live connections.
5. For extracts, click the **Sheet** tab to create and save the extract.
6. Select **Server > Publish Data Source** to begin the publishing process. If you haven’t already signed in to Tableau Online, you will be prompted to.
7. Under **Authentication**, click select the authentication type. The options displayed are dependent on the data source. In most cases, Saved Credentials are recommended. For more information, see **Refresh Data Using Saved Credentials**.
   - If you have saved credentials data source in My Account Settings, select **Embed <data source name>**.
   - For extracted data, choose whether to allow refresh access. When you allow refresh access for extracts, you are prompted to set up a schedule. To schedule for a refresh, you must use embedded credentials.
8. When Bridge is required, your connection will be detected as Private during the publish operation. To change your network connection status, click the **Actions** menu, and select **Edit Connection**.

**About the Bridge Client**

This topic describes the Bridge client and requirements for running and using it. In most cases, the site admin is responsible for installing and managing the client.

**Client overview**

The client is required to enable connectivity between Tableau Online and private network data. When the client is running, it’s accessible from the Windows system tray on the machine where it is installed.
The client is comprised of the following parts:

1. **Client name**, which is also the name of the machine where the client is installed.

2. **Connection status** indicates whether the client is connected to Tableau Online.

3. **Site**: The Tableau Online site that the client is registered to.

4. **Settings menu**, which contains options to disable error reports and unlink the client from a site.

5. **Data sources**: By default, this area displays a list of live queries that are being load balanced (or pooled) by clients across the site. This list can also contain data sources that have been assigned to this specific client using Bridge (legacy) schedules.

   **Note**: This list does not show data sources or virtual connections that are refreshed with the Online schedules. To see data sources or virtual connections refreshed with Online schedules, go to the Jobs page and filter on **Bridge Refreshes**.

6. **Pooling status**: This shows whether the data source is part of the client pool.
   - **Live**: A Live status indicates the data source has a live connection and is part of the pool of clients. **Note**: Virtual connections with live connections do not show
in this list.

- Blank: A blank status indicates the client is not part of the pool. This is because the data source is using Bridge (legacy) schedules.

7. **Legacy options**: These options display on hover to edit or view connection information, go to the schedule, and run a manual refresh on hover for data sources that use Bridge (legacy) schedules.

8. **Client mode** indicates if the client is running as a Windows application or service. For more information, see the section below.

**Application versus Service mode**

A client can operate in one of two modes: Application or Service.

The mode the client can run depends on the Windows user account it’s running under, the Tableau Online site settings that the client is registered to, and general data freshness needs.

- **Application**: When the client is set to run in Application mode, it runs as a Windows application.

  In this mode, the client can facilitate live queries and scheduled refreshes for content that connects to private network data while the dedicated user is logged on to Windows. If the dedicated user logs off Windows, the client cannot maintain live queries and refresh extracts on a schedule. Client versions 2020.1 and earlier run in this mode by default.

- **Service**: When the client is set to run in Service mode, it runs as a Windows service.

  In this mode, the client runs continuously even if the user is logged out of Windows. The Windows user account must be a member of the local Administrators group to run the client in service mode. This mode is recommended for pooled clients that load balance live queries and scheduled refreshes. Service mode is the default mode beginning with Bridge 2020.2 clients.

**Mode guidelines**
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<th>Live connection</th>
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<td></td>
</tr>
<tr>
<td>• Quickly set up and validate that the client is keeping content up to date.</td>
<td></td>
</tr>
<tr>
<td>• Have more control over when the client is performing data freshness tasks.</td>
<td></td>
</tr>
<tr>
<td>• Doesn't require the user to be a local admin on the machine.</td>
<td></td>
</tr>
<tr>
<td>• Requires the user to be logged on to Windows.</td>
<td></td>
</tr>
<tr>
<td><strong>Service mode</strong></td>
<td></td>
</tr>
<tr>
<td>• Set up the client once — if the machine has to restart, the client reconnects to Tableau Online automatically.</td>
<td></td>
</tr>
<tr>
<td>• Requires the Windows user account to be a member of the local Administrators group on the machine. In addition, to refresh file-based data sources, the account must have domain access to the network shared drive where the file data is hosted.</td>
<td></td>
</tr>
<tr>
<td>• Doesn't require the user to be logged on to Windows.</td>
<td></td>
</tr>
</tbody>
</table>

Recommended for load balancing refreshes. For more information, see Configure the Bridge Client Pool.  
Recommended for load balancing live queries. For more information, see Configure the Bridge Client Pool.

### Client requirements

In order to run and use the client, a certain set of requirements must be met as well as some additional requirements that are unique to the data freshness task.

#### Core requirements

- Client can only run on 64-bit version of Windows.
- Only one client can be installed on a machine.
- The machine on which the client is running must be on the same Windows domain and have access to the underlying database specified in the data source or virtual connection.

- Both the machine and the Windows user must have access to the underlying data specified in the data source or virtual connection.

- The appropriate database drivers must be installed on the machine where the client is running.

- Tableau Online’s connected clients option must remain enabled to allow the client to run unattended and, if enabled, support multi-factor authentication with Tableau authentication. For more information about the connected clients option, see Connected client requirement for Tableau Bridge.

- If multi-factor authentication (MFA) is enabled with Tableau authentication, Bridge clients must be running Tableau Bridge version 2021.1 and later. For more information about Tableau with MFA, see About multi-factor authentication and Tableau Online.

For more information, see Recommended software and hardware.

Additional requirements for Service mode

- To run the client in **Service** mode, the Windows user account running Bridge must be a member of the local Administrators group on the machine. The user doesn’t need to be logged on to Windows, but the machine must be powered on with Windows running.

- When using the client in **Service** mode and connecting to file data hosted on a network shared drive, it’s required that the account have domain access to the network shared drive.

Additional requirements for extract connections

To refresh extracts, the client can run as a Windows service or as an application. In addition to the core requirements above, the following requirements must be met:
The user signed in to Tableau Online from the client must have a **Creator**, **Explorer (Can Publish)**, or one of the two types of site admin role: **Site Administrator Creator** or **Site Administrator Explorer**.

If the user is not a site admin, he or she must be the content owner.

- If the client is set to run as an application, it completes refreshes only when the machine is powered on, and the Windows user is logged on and running Bridge.

If the machine is turned off, if the user logs off of Windows, or if the user exits the client, updates for the data sources or virtual connections running on that client (either through the pool or manually) will not be able to reach Tableau Online, and the data sources or virtual connections won’t get refreshed until the user signs in again. During this time, the content owner will receive refresh failure notification emails from Tableau Online. For more information, see Stop Keeping Data Fresh Through Bridge.

- To ensure refreshes of file-based data sources complete without any issues, a client that has been set up to run as a service must reference the full UNC path of the source file and not the mapped drive path. For example, use ",filesrv\Data\file.csv" instead of "C:\Data\file.csv".

For a client that has been set up to run as an application, we strongly recommend that the client also references the full UNC path. For more information, see Change the file path for a data source.

Additional requirements for live connections

To run live queries, the client can run as a Windows service or as a Windows application. In addition to the core requirements above, the following requirements must be met:

- The user signed in to Tableau Online from the client must have one of the two types of site admin roles: **Site Administrator Creator** or **Site Administrator Explorer**.

- Each Tableau Online site can have multiple clients that maintain live connections. Those clients can also be used to refresh extracts.
• If the client is set up to run as an application, live queries can only occur when the computer is on and the Windows user is logged on and running Bridge.

If the computer is turned off, if the user logs off of Windows, or if the user exits the client, updates to the data sources or virtual connections will not be able to reach Tableau Online, and the content can't be kept up to date.

• To maintain live connections, the databases that the Tableau content connect to can't be accessible from the public internet.

Repair a client running in Service mode

Occasionally something causes content connections to stop functioning normally. When this happens, an alert appears, and it usually provides information that direct you toward the cause of the problem. However, if Tableau Online cannot provide troubleshooting information in the alert, and if you run Tableau Bridge as a service, you can use the Repair command to try to reset connections.

To help repair a client in Service mode, in the Windows system tray, right-click the Bridge icon and select Repair. This stops and restarts the service, which can be enough to resolve the issue.

Configure the Bridge Client Pool

This topic describes how site admins can configure and manage pooling for Bridge clients. Pooling allows clients across the site to load balance data freshness tasks for data sources or virtual connections that connect to private network data.

Configure pooling

The purpose of a pool is to distribute (or load balance) data freshness tasks among the available clients in a pool whose access is scoped to a domain within your private network. Pools map to domains, giving you the ability to dedicate pools to keeping specific data fresh and maintaining security by restricting access to protected domains in your private network.
Although the client in the pool that performs the data freshness task is chosen at random, if for whatever reason a client can no longer perform the task, the task is automatically rerouted to another available client in the pool to handle the task. There is no additional intervention required from you or your users to support or manage the pool of clients.

Pooling is optimized for keeping data sources or virtual connections that connect to data on one or more private networks fresh. Pooling support does not extend to data sources that use Bridge (legacy) schedules.

In general, pooling is optimized for the following situations:

- **Bridge is used as a critical service.** If your organization requires that live query and scheduled refresh support must be available even if a client becomes unavailable.

- **Client is at capacity.** If your existing site traffic exceeds the current capacity of the client.

- **Tableau Online-managed schedules for file-based data sources.** Beginning with Bridge client version 2021.4.3, Bridge pools enable Online schedules for file-based data sources. **Note:** file-based data sources

- **Keeping data fresh on multiple private networks.**

- **Virtual connections.** (Requires Data Management) Bridge is required to refresh data in virtual connections that connect to private network data. For more information about virtual connections, see About Virtual Connections and Data Policies.

Before configuring the pool

Before you can configure a client pool for your site, review the following:

- Clients must be installed and running. For more information about software and hardware, see Recommended software and hardware.

- Clients are configured to run as a service. For more information, see Application versus Service mode.

- The user authenticated into a client is a Tableau Online site admin. For more information about deploying Bridge, see Plan Your Bridge Deployment.
• To keep virtual connections fresh, ensure all clients in the pool are running Bridge 2021.4 (or later).
• To load balance file-based data sources, ensure the following:
  • All clients in the pool are running Bridge 2021.4.3 (or later).
  • References to file data must use the full UNC path that includes the server name or hostname. For more information, see About the Bridge Client.
  • File-based data sources are extract only.

Note about user roles

Only site admins, or users with either the Site Administrator or Site Administrator Creator role, can configure and maintain pooled clients. Regardless of the type of user authenticated into the client, only site admins can add new pools, add clients to a pool, remove clients from a pool, and monitor clients in a pool.

Note about refresh jobs

The Jobs page can show you the completed, in progress, pending, canceled, and suspended all Bridge refresh jobs that use Online schedules. This includes refreshes for file-based and non-file based data sources. For more information, see About Bridge Refresh jobs. For more information about various ways you can monitor Bridge activity, see Monitor data freshness tasks.

Step 1: Ensure clients can connect to the site

In order for Bridge to work with your site, you must allow clients to authenticate to the site.

1. Sign in to Tableau Online using your site admin credentials and go to the **Settings** page.
2. Click the Authentication tab and validate that the **Let clients automatically connect to this Tableau Online site** check box under the Connected Clients heading is selected. For more information about this check box, see Access Sites from Connected Clients.
**Note:** If enabled, the connected clients option must be enabled to support multi-factor authentication with Tableau authentication. If connected clients are disabled for your site, Bridge can only support Tableau username and password authentication.

Step 2: Configure a pool

Pools, which require Bridge 2021.4 (or later) clients, help route live query and extract refresh jobs to the appropriate private network. Use pools to access data distributed across multiple private networks, enable extract refreshes for file-based data sources, and to support data freshness tasks for virtual connections.

1. On the Bridge tab, under Pooling, click the **Add New Pool** button.
2. In the dialog box, enter a new pool name in the Pool text box and click **Save**.

After you have at least one pool configured, as part of the publishing process, Tableau Online associates certain data sources or virtual connections with Bridge and client pools automatically.

Step 3: Specify a domain for a pool

Each new pool requires a domain to be specified through the **Private Network Allowlist**. This information is required to enable Bridge access to data in the private network on behalf of Tableau Online.

Using the allowlist, you must specify the domain names or IP addresses of the private network where you want to enable client access.

**Domain names**

The domain names that you specify in the allowlist are the server names used in the data source connection or virtual connection. In some cases, you can find the server name listed in the **Connections** tab of the data source page in Tableau Online.

For example, to keep data sources like “Starbucks” up to date, you might specify “mssql.-myco.lan” and “oracle.myco.lan” or “*.myco.lan” in the allowlist.
To keep data sources like "Fitness Challenge" up to date, specify "fitness-challenge" in the allowlist.

In other cases, the Connections tab might not list the server name. When the server name is not listed, consider working with the content owner to identify where the data is hosted and specify the server name in the allowlist when you have that information. As a temporary alternative, you can skip to Step 4: Add clients to a pool to assign clients to use the Default Pool instead.

**IP addresses**

Instead of domain names, you can specify IPv4 addresses in the allowlist. We recommend you specify IPv4 addresses in the allowlist if IPv4 addresses are used in the data source connections or virtual connections. Consider working with your content owners to get this
information. If you don’t have that information, as a temporary alternative, you can skip to Step 4: Add clients to a pool to assign clients to use the Default Pool instead.

Notes:

- For security purposes, the allowlist is empty by default to prevent Tableau access. This ensures that site admins specify what data can be sent to Tableau Online using Bridge.
- You can assign one or more domains to a pool.
- If your site was set up to use pooling prior to Tableau 2021.4, the **Default Pool** remains for backward compatibility purposes but can’t be configured to access a specific private network. To reduce the scope of access of this pool and to enable more advanced scheduling capabilities, we recommend you create new pools and map them to specific domains.

To map a domain to a pool, do the following:

1. While on the Bridge tab, under the Private Network Allowlist, click the **Add New Domain** button.
2. In the **Domain** text box, enter the URI of the domain using the information described in Allowlist registry rules.
3. Under Domain permissions, ensure the **Allow** radio button is selected.
4. Under **Pool**, select the pool whose scope of access should be limited to the URI you specified in step 2.
5. Repeat steps 1-4 for each additional domain.
6. When finished, click **Save**.

Allowlist registry rules

Use the following rules when specifying the domains that you want to enable Bridge access to. This allows Bridge, on behalf of Tableau Online, to access the data on your private network to perform data freshness tasks. A domain enables Bridge to connect to both databases and file data hosted in that domain.
Notes:

- Domains are not verified when added to the allowlist, when data sources or virtual connections are published, or when refresh schedules are configured.
- Duplication due to the same domain being added to the allowlist as both the domain name and its IP address are not verified. In this scenario, if one pool maps to the domain name and another pool maps to the IP address, the format specified in the data source connection or virtual connection determines which pool keeps the data fresh.
- Domains must be accessible by Bridge. This means, all clients in the pool must have access to the specified domain.
- If no domains are specified, Bridge is unable to run data freshness tasks for data sources or virtual connections configured for Online schedules. Note: Data sources configured for Bridge (legacy) schedules will continue to run in the same way.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact domain name</td>
<td>Can either be a FQDN or PQDN. Port numbers are not allowed.</td>
<td>myco.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>marketing.myco.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>oracle.myco.com</td>
</tr>
<tr>
<td>Range of domain names</td>
<td>Use an optional leading wildcard (*) to include all subdomains. The * must be followed directly by a period (.).</td>
<td>*.myco.com</td>
</tr>
<tr>
<td>Exact IPv4 address</td>
<td>Use an IPv4 literal (abbreviations are not allowed). IPv6 addresses are not allowed.</td>
<td>255.255.0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>192.168.0.0</td>
</tr>
<tr>
<td>Range of IPv4 addresses</td>
<td>Use a subnet mask to include a range of IPv4 addresses.</td>
<td>255.255.0.1/16</td>
</tr>
<tr>
<td>Block domains</td>
<td>Block Bridge connectivity to hosts in this domain.</td>
<td>When adding or editing a domain in the private network allowlist, select the <strong>Block</strong> radio button option.</td>
</tr>
</tbody>
</table>
Allowlist registry examples

**Example 1 - database data**

Suppose you want Bridge to do the following:

- Perform data freshness tasks for data located in `data.lan` and `sqlserver.myco.lan`.
- *Prevent* data freshness tasks for data located in `oracle.myco.lan`.

To enable Bridge to support these scenarios, you can map the domains to two pools (A and B) and block the third domain.

<table>
<thead>
<tr>
<th>If you specify...</th>
<th>and map to pool...</th>
<th>...data is refreshed in locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.lan</td>
<td>Pool A</td>
<td>data.lan</td>
</tr>
<tr>
<td>sqlserver.myco.lan</td>
<td>Pool B</td>
<td>sqlserver.myco.lan</td>
</tr>
<tr>
<td>*.myco.lan</td>
<td>(Blocked)</td>
<td>-</td>
</tr>
</tbody>
</table>

**Note:** Although this domain range blocks data freshness tasks on `oracle.myco.lan`, a blocked domain range can unblock a specific domain within it if the domain is explicitly allowed, such as `sqlserver.myco.lan`.

**Example 2 - file data**
Suppose you have file data, C:\Shared\employees.csv, located on fileserv.myco.lan. To enable Bridge access to this data, map the domain of the machine to a pool. You can specify one of the following domains to a pool:

- Option #1: *.lan
- Option #2: *.myco.lan
- Option #3: fileserv.myco.lan

**Note:** The host machine must allow network access to the "Shared" folder.

**Step 4: Add clients to a pool**

Follow the procedure below to assign clients not already assigned to a pool.

**Note:** To support data freshness tasks for all data, ensure clients in the pool are running Bridge 2021.4 (or later).

1. On the Bridge tab in the Unassigned Clients table, navigate to the client you want to assign to a pool and click Assign.
2. In the Pool drop-down menu, select the pool you want to associate with the client.
3. Repeat step 2 for each unassigned client you want to assign to a pool.

**Troubleshoot pooling**

**Bridge Refresh jobs fail with one of the errors listed below.**

The following errors can be seen on the Jobs page and the Background Tasks for Non Extracts admin view.

- "errorID=NO_POOLED_AGENTS_ASSIGNED"

This issue can occur for one of two reasons:

- When the server address or IP address of a data source does not match a domain specified in the Private Network Allowlist. This causes refresh jobs to be sent to the Default Pool where there are no assigned clients.

  To resolve this issue, make sure 1) the allowlist contains the domains (server addresses or IP addresses) used by the data sources, and 2) at least one pool
is associated with those domains (server addresses or IP addresses). For more information, see Step 3: Specify a domain for a pool.

- When there are no clients in the pool. To resolve this issue, add at least one Bridge 2020.2 (or later) client to the pool. For more information, see Step 4: Add clients to a pool.

- "errorID=NO_POOLED_AGENTS_ASSIGNED_NAMED_POOL"

This issue can occur when there are no clients in the pool. To resolve this issue, add at least one Bridge 2021.4 (or later) client to the pool. For more information, see Step 4: Add clients to a pool.

- "errorID=NO_AGENT_IN_POOL_SUPPORTS_REMOTE_EXTRACT_REFRESH"

This issue can occur when a refresh job tries to run without at least one Bridge 2020.2 (or later) client in the pool. To resolve this issue, add at least one Bridge 2020.2 (or later) client to the pool. For more information, see Step 3: Specify a domain for a pool.

- "errorID=NO_POOLED_AGENTS_CONNECTED"

This issue can occur when none of the clients in the pool are available to run data freshness tasks. For more information, see the Configure the Bridge Client Pool section above.

- "errorID=REMOTE_EXTRACT_REFRESH_ALL_AGENTS_BUSY" or "errorMessage: Maximum concurrency reached" in the client

These issues can occur if the number of refresh jobs running at a given time exceeds the capacity of your client pool. To help resolve this issue, you can do the following:

  * Add additional clients to the pool. For more information, see Step 4: Add clients to a pool.
  * Increase the size of the connectionPool setting on each client. For more information, see Manage the size of the Bridge pool.

- "errorID= AGENTS_IN_POOL_REQUIRE_UPGRADE"
Beginning with Tableau 2021.4, this issue can occur when the clients in the pool need to be upgraded to Bridge 2021.4 (or later) in order to run data freshness tasks. For more information about upgrading clients, see Install Bridge.

**Bridge clients are being signed out**

This issue can happen if you deploy a large number of clients under the same Windows services account. When there are more than 10 clients running under one Windows services account, account security measures can cause clients to be logged out. For more information, see Windows services account.

**Other potential pooling issues**

When trying to diagnose issues related to pooling, consider reviewing the following log files for a client on the Bridge client machine: `tabbridgeclijob_<process_id>`, `jprotocolserver_<process_id>`, `stdout_jprotocolserver_<process_id>`. For more information, see Manage Bridge log files.

**Manage the Bridge Client Pool**

There are a few ways you can manage your pooled Bridge clients.

**Monitor data freshness tasks**

You can monitor client activity using a combination of the Jobs page and built-in admin views.

Live queries

To monitor live query activity, you can use the Traffic to Bridge Connected Data Sources admin view.

Refresh jobs

To monitor refresh jobs, you can use the following resources:
Tableau Online Help

- **Jobs page**: The Jobs page can show you the completed, in progress, pending, canceled, and suspended Bridge refresh jobs that use Online schedules. For more information, see About Bridge Refresh jobs.

- **Background Tasks for Non Extracts admin view**: After filtering on Refresh Extracts Via Bridge, this admin view shows Bridge refresh jobs that use Online schedules. For more information, see Background Tasks for Non Extracts.

- **Bridge Extracts admin view**: This admin view shows Bridge refresh jobs that use both Online schedules and Bridge (legacy) schedules. For more information about this view, see Bridge Extracts.

- **Create a data source or view using client logs**: Using JSON log files generated by a client, create your own data sources and views to monitor refresh jobs. For more information, see the Refresh jobs by client section below.

Refresh jobs by client

As an alternative to monitoring refresh jobs using the admin views listed above, consider creating your own data sources and views to monitor refreshes performed by a Bridge client. You can do this by using Tableau Desktop to connect to a client’s JSON log files on the machine where the client is running.

**Note**: A client’s JSON log files do not capture refreshes for virtual connections.

The JSON log files are comprised of objects, “k” and “v”. The “k” objects capture refresh jobs and “v” objects capture refresh details. The refreshes and their details include:

- Schedule type - Online or Bridge (legacy)
- Data source type and name
- Refresh start and end time, duration, time to upload and publish
- Errors

**Step 1: Before you begin**

If you want to build a view from the data of one log file, you can skip to **Step 2**.
If the data for a client is in multiple log files, you’ll need to union the files. You can create a script to union the log files locally or use Tableau Desktop to perform the union as described in the procedure below.

Notes:

- The procedure described below assumes you are running Tableau Desktop on the same machine as the client.
- If you are working with multiple log files from different clients in a pool, in addition to unioning multiple logs files for a client, you can join the log files from multiple clients to monitor refreshes in a pool.
- Connecting to JSON files directly from Tableau Online web authoring is currently not supported. For more information, see Creators: Connect to data on the web.

Step 2: Connect to JSON logs

To build a data source and view, connect to a client’s log files using Tableau Desktop.

1. Start Tableau Desktop and under Connect, select JSON file. Do the following:
   a. In the Select Schema Levels dialog box, select the top level schema to include “k” object details and optionally, select the “v”-level schema to include "v" object details, and then click OK.
   b. Navigate to the log file you want to connect to (for example, C:\User-s\jsmith\Documents\My Tableau Bridge Repository\Logs), select it, and then click Open.

2. (Optional) On the data source page, right-click the log files and click Convert to Union to set up a union. Do the following:
   a. Select Wildcard (automatic) tab.
   b. Next to Search In, verify the path shows the client’s Log folder.
   c. Under Matching pattern, enter ExtractRefreshMetrics_* and click OK.

3. Select the sheet tab to start your analysis and build your view.

4. When finished, publish the data source and view to Tableau Online separately. To
ensure that your data source is kept up to date, you can set up a Bridge (legacy) schedule for the data source after publishing.

Be aware that the data sources and views you create can change without warning because new log files can be generated and old log files can be deleted after certain log-specific limits are met. For more information about these limits and how to adjust them, see Change the Bridge Client Settings.

Manage pools and clients

Under the Pooling section, you can see up to five tables of pooling and client related information in your Bridge deployment.

About pools

The first table consists of clients registered to the site organized by the pools they are assigned to.

The second table, **Unassigned Clients**, shows clients not assigned to a pool. In most cases, these clients need to be assigned to a pool before they can load balance live query and extract refresh jobs. In other cases, clients in this table might be dedicated to refreshing data sources using Bridge (legacy) schedules.
The third table, **Default Pool**, shows clients in the default pool. Clients configured to use pooling prior to Bridge 2021.4 are included in this pool by default. Because the default pool's domain can't be configured to access a specific private network, we recommend you reduce its scope of access by creating new pools and mapping them to specific domains.

The clients you see in the first three tables can tell you the following information:

- **Client name**, also known as the computer name, is the name of the machine the client is installed on and running from.

- **Owner name**, which in most cases is a site admin. This is the user who is authenticated (signed in) to Tableau Online from the client.

- **Pool status**, applies to the first table only, can indicate 1) whether there are assigned clients in the pool, 2) clients are connected and available to handle data freshness tasks, or 3) pool is offline because all clients in the pool are disconnected.

- **Client version**: A warning icon (⚠️) displays in this column when the client is not running the latest version of Bridge. Although not required, we strongly recommend
upgrading to take advantage of the latest security and feature updates. To download the latest version of Bridge, go to the Tableau Bridge Releases page on the Tableau website.

**Note:** The warning icon shows only when there is a newer client available for download. The warning icon is not an indication that there are issues with the client or related Bridge data sources or virtual connections.

- Connection status—for more information see the Client connection status, below.
- Last connected—shows the day and time Tableau Online was last able to reach the client.

About Private Network Allowlist

The fourth table, **Allowlist Registry**, contains a list of domains that pools are scoped to.

<table>
<thead>
<tr>
<th><strong>Private Network Allowlist</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Allowlist Registry</strong></td>
</tr>
<tr>
<td>Allowlist registry consists of domains. Specify the domain names in the private network allow list to enable Tableau Online to connect to private network data using Bridge. <a href="#">Learn more</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain</th>
<th>Pool</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>@test</em></td>
<td>Fu_Pool</td>
</tr>
<tr>
<td>cb1.test</td>
<td>Fu_Pool</td>
</tr>
<tr>
<td>sqlserver.test</td>
<td>Fu_Pool</td>
</tr>
<tr>
<td>cb2.test</td>
<td>Blocked</td>
</tr>
</tbody>
</table>

The fifth table, **Allowlist Requests**, shows pending domains that users have requested to connect to when trying to create virtual connections. These domain requests should be addressed as soon as possible to unblock users from their virtual connection workflows.
Client connection status

Where clients are listed, the colored squares and status labels indicate the *availability* of the client to support data freshness tasks.

- Green or "Connected": A green or *Connected* state indicates that the client is connected and *available* to support live queries and extract refreshes.

- Red or "Disconnected": A red or *Disconnected* state can indicate one of a few conditions that have temporarily put the client in a disconnected state. The most common scenario is if the client is not running or was unable to establish communication with Tableau Online after being launched. You can hover over the status to see a tooltip that describes the condition.

**Notes:** When the client is in a disconnected state, live queries might be disrupted. In cases like this, views that depend on data sources or virtual connections with live queries might not properly display until the issue is resolved.

The states described above reflect and correspond to the status you see in the client.

![Tableau Bridge - WIN-Q](image)

### Change the Bridge Client Settings

There are several Bridge client settings that the site admin can configure to change how a client runs. In some cases, a data source owner might be responsible for some of the tasks...
described in this topic if he or she maintains his or her own client to run Bridge (legacy) schedules.

Run Bridge as a Windows service

In order for a client to be included in a pool, the client should run as a Windows service (Service mode). By default, a client is set to run as a Windows service so that it can load balance live queries and refreshes in the background without requiring a dedicated user to be logged in to the machine. For a client to run as a Windows service, the Windows user account that runs the client must be a member of the local Administrator group on the machine.

**Note:** If you’re a data source owner and managing the client yourself, your client will not be included in the pool. However, if you want the Bridge (legacy) schedule to run in the background even when you’re not logged on to your machine, your client must be running as a Windows service (Service mode).

1. Open the Windows system tray and click the Bridge icon to open the client.

2. From the Mode drop-down menu, select **Service**. A sign-in windows displays.

3. Enter your local admin credentials.

   In your list of Windows services, Bridge appears as **Tableau Bridge service**. You can see this in the Windows Services console or on the Services tab in the Task Manager.

Stop running Bridge as a Windows service

To stop the client from running as a service, change its mode.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. From the Mode drop-down menu, select **Application**.
When the client is running in Application mode, live queries and scheduled refreshes can only run when the user is logged in to the Windows user account on the machine where the client is running from.

Switch the site a client is associated with

When you want to use a client to keep content published to a different Tableau Online site fresh, you can unlink the existing client and authenticate to the new site from the client.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. From the drop-down menu, select Unlink.

Unlink removes the list of data sources that use Bridge (legacy) schedules, schedules, and connection information from the client.

3. Open the Windows system tray and click the Bridge icon to open the client.

4. When prompted, sign in to the new site with your site admin credentials.

5. Do one or both of the following to configure the client:

   - If this client refreshes data sources associated with a specific client, ask data source owners to reconfigure their data sources and refresh schedules.

   - If you want this client to facilitate live connections or extract connections that
use Online schedules, ensure that the new client is part of the pool. For more information, see Configure the Bridge Client Pool.

When you unlink a client, you might also need to remove the Bridge (legacy) schedules for the data sources that the client was refreshing. The other data sources will continue to have data freshness tasks performed by other registered clients in the pool.

For more information, see Effects of exit and unlink.

Configure a timeout limit for refreshes

To govern the misuse of extracts or refreshes, you can enforce a time limit, also known as a timeout limit, for refreshes performed by a client. The timeout limit is the longest allowable time for a single extract to complete a refresh before it's canceled by the client. If an extract refresh is canceled as a result of reaching the timeout limit, you will see a message in the client and an email alert will be sent to the data source owner.

By default, the timeout limit for a client is set to 24 hours. You can change the timeout limit for a client through the Bridge configuration file.

**Note:** The client must be restarted for any changes made to the configuration file to take effect.

1. On the machine where the client is installed, go to the **Configuration** folder in the My Tableau Bridge Repository.

   The default location of the Configuration folder is `C:\Users\jsmith\Documents\My Tableau Bridge Repository\Configuration`.

2. Open the **TabBridgeClientConfiguration.txt** file.

3. Next to `extractRefreshTimeout`, change the time allowed for a refresh task to complete.
**Note:** If you don’t see the parameter in the configuration file, you can add "extractRefreshTimeout" : 08:00:00", to the `dataSourceRefreshSettings` setting like in the example below.

```
{  
    "serviceConnectionSettings": {  
        "serviceUrl" : "https://online.tableau.com",  
        "connection": {  
            "connectTimeout" : "00:01:00",  
            "operationTimeout" : "00:15:00",  
            "maxAttemptsToRedirectHttpRequests" : 20  
        },  
        "connectionPool": {  
            "size" : 4  
        },  
        "dataSourceRefreshSettings": {  
            "shutdownTimeoutInSeconds" : "00:00:30",  
            "downloadDataSourcesInterval" : "00:30:00",  
            "checkRefreshDataSourcesInterval" : "00:00:05",  
            "extractRefreshTimeout" : "08:00:00",  
            "dataSources": [ ]  
        },  
        "loggerSettings": {  
            "maxLogFileSizeInMB" : 25,  
            "maxBacklogLogFileCount" : 40  
        },  
        "dataSyncRestartInterval" : "24:00:00",  
        "internetConnectionMonitorInterval" : "00:00:30",  
        "secureStorageMonitorInterval" : "00:00:30"  
    }  
}
```

4. Save and close the file.

5. Exit and restart the client for the changes to take effect. The way you restart the client depends on whether the client is running in Application or Service mode.

   - For Application mode: from the client menu, select **Exit**.
   - For Service mode: from the Mode drop-down menu, select **Application**; from the client menu, select **Exit**.

**Manage Bridge log files**

The client creates logs of activities as part of its normal operation. You can use these logs to monitor refreshes, troubleshoot issues with Bridge, or if Tableau Support requests logs from you to help resolve an issue.
You can manage the size of Bridge log files or increase the time log files remain before being deleted in the TabBridgeClientConfiguration.txt file.

Configurable options

- **maxLogFileSizeInMB**: By default, the maximum size allowed for a Bridge log file is 25 MB. When a log file exceeds the size limit, a new log file is created.

- **maxBackupLogFileCount**: The default value for the maximum number of allowed Bridge log files is 40. When the number of log files exceed the limit, the oldest log file is deleted.

- **remoteRequestLogFileLifeSpan**: For each Bridge Refresh job that is sent to the client, a new set of log files are created: tabbridgeclijob_<process_id>, jprotocolserver_<process_id>, and stdout_jprotocolserver_<process_id>. By default, the maximum amount of time the log files remain in the Logs folder before being deleted is 8 hours if the number of log files exceed maxBackupLogFileCount. Otherwise, these log files remain indefinitely while the number of log files is less than or equal to maxBackupLogFileCount.

**Note**: Here, <process_id> represents the Windows process ID.

**Note**: Log files named *tabprotosrv* vary from other Bridge log files. The maximum size is 1 MB and the maximum number of allowed log files is 8,192. These values are also not configurable.

1. On the machine where the client is installed, go to the **Configuration** folder in the My Tableau Bridge Repository.

   The default location of the Configuration folder is C:\Users\jsmith\Documents\My Tableau Bridge Repository\Configuration.

2. Open the **TabBridgeClientConfiguration.txt** file.

3. Next to **loggerSettings**, you can change the values for the following parameters:
"maxLogFileSizeInMB" : 25
"maxBackupLogFileCount" : 40
"remoteRequestLogFileSize" : "08:00:00"

4. Save and close the file.

5. Exit and then restart the client for the changes to take effect. The way you restart the client depends on whether the client is running in Application or Service mode.
   - For Application mode: from the client menu, select **Exit**.
   - For Service mode: from the Mode drop-down menu, select **Application**; from the client menu, select **Exit**.

Manage the size of the Bridge pool

By default, each client in a pool can load balance up to 10 refresh jobs at one time. If the number of refresh jobs running at a given time exceeds the capacity of your client pool or you have the hardware resources to support it, consider increasing each client's capacity.

You can manage a client's pooling capacity in the TabBridgeClientConfiguration.txt file.

Configurable options

- **ConnectionPool**: This is the absolute maximum number of concurrent refresh jobs allowed by the client. The default value is 10, the minimum allowed value is 1, and the maximum allowed value is 100. Changing this value requires unlinking the client.

- **maxRemoteJobConmectracy**: This is the maximum number of concurrent refresh jobs allowed by the client that can be used to tune or troubleshoot client performance issues without having to change the absolute values in
To change ConnectionPool

**Important:** The procedure described below requires unlinking the client. Unlinking removes the association between the site and the client. This means for data sources that are refreshed using Bridge (legacy) schedules, unlinking the client removes associations to those data sources, its schedules, and any connection information from the client. As part of modifying the size of the Bridge pool, we recommend you click the Bridge icon in the Windows System tray and note the data sources listed (step 5) to aid the rescheduling process (step 10).

1. On the machine where the client is installed, go to the Configuration folder in the My Tableau Bridge Repository.

   The default location of the Configuration folder is C:s\jsmith\Documents\My Tableau Bridge Repository\Configuration.

2. Open the TabBridgeClientConfiguration.txt file.

3. Edit the value next to ConnectionPool.

4. Save and close the file.

5. (Optional) Click the Bridge icon in the Windows System tray and note the data sources listed and the refresh schedules that have been configured for those data sources.

6. Right-click the Bridge icon in the Windows System tray and select Unlink.
For more information about the Unlink option, see Effects of exit and unlink.

7. Exit the client for the changes to take effect. The way you exit the client depends on whether the client is running in Application or Service mode.

   - For Application mode: from the client menu, select **Exit**.
   
   - For Service mode: from the client menu, select **Exit**. In the dialog box, select the **Exit client and stop activities** check box and click **Close**.

8. Start Bridge again.

9. When prompted, sign in Tableau Online using your site admin credentials.

10. **(Optional)** If you followed step 5 for data sources that use Bridge (legacy) schedules, follow the procedure described in **Add a new or update an existing Bridge (legacy) schedule to reschedule the refreshes and effectively re-associate the data sources with the client.**

**To change maxRemoteJobConcurrency**

1. On the machine where the client is installed, go to the Configuration folder in the My Tableau Bridge Repository.

   The default location of the Configuration folder is C:\Users\jsmith\Documents\My Tableau Bridge Repository\Configuration.

2. Open the **TabBridgeClientConfiguration.txt** file.

3. **Edit the value next to** maxRemoteJobConcurrency.

4. Save and close the file.
5. Exit the client for the changes to take effect. The way you exit the client depends on whether the client is running in Application or Service mode.

- For Application mode: from the client menu, select Exit.
- For Service mode: from the client menu, select Exit. In the dialog box, select the **Exit client and stop activities** check box and click Close.

![Exit dialog box](image)

6. Start Bridge again.

7. When prompted, sign in to Tableau Online using your site admin credentials.

8. (Optional) If you followed step 5 for data sources that use Bridge (legacy) schedules, follow the procedure described in Add a new or update an existing Bridge (legacy) schedule to reschedule the refreshes and effectively re-associate the data sources with the client.

**Publish a Bridge Data Source with a Live Connection**

This topic describes how a data source owner can publish a data source that uses a live connection to private network data. Data sources that connect to private network (including private cloud) data rely on Tableau Bridge. The tasks described in this topic assume Bridge has already been set up and is being maintained by your site admin.

**Notes:**

- Bridge keeps data fresh for published data sources only, i.e., data sources published separately from workbooks. Bridge can't keep data fresh in data sources embedded in workbooks.
- To publish a private cloud-based data source that uses a live connection, see Use Bridge for Private Cloud Data.
To publish a virtual connection with a live connection, see Create a Virtual Connection.

Publish a data source

The procedure below describes how you can publish a data source that uses a live connection. To support live connections to data sources that connect to private network data, Bridge uses functionality called live queries. To keep the data source up to date, Bridge queries the database directly and returns the results of the query for use in the data source.

1. In Tableau Desktop, create your data source.
2. Select Server > Publish Data Source to begin the publishing process. If you haven’t already signed in to Tableau Online, you will be prompted to.
3. In the Publish Data Source to Tableau Online dialog box, configure the various options for your data source and ensure you do the following:
   - Under Authentication, click Edit and select Embedded password or Server Run As account depending on the option you see.
   - Depending on the data that the data source is connected to or how you’ve configured the data source, the dialog can default to publishing a live connection or give you the option to publish a live connection or extract. If you are provided with options, select Maintain a live connection.
4. Click the Publish button. This opens a browser window to Tableau Online.
5. In the Publishing Complete dialog box, click the Done button.

Stop Keeping Data Fresh Through Bridge

This topic describes the ways a data source owner can stop refreshing data through Tableau Bridge when running Bridge (legacy) schedules.

Notes:

- If you stop using Bridge, views that depend on data sources that rely on Bridge will no longer display data and produce blank pages instead.
Remove a data source from a client

One way you can stop a client from refreshing a data source that uses the Bridge (Legacy) schedule by removing the data source from the client.

1. Open the Windows system tray and click the Bridge icon to open the client.
2. Hover over the data source name and click the Remove icon next to the data source name.

Stop using Bridge temporarily or permanently

- To stop using a client and temporarily suspend updates to data sources performed by the client, open the client from the system tray, and on the settings menu in the upper-right, select Exit.

When you exit, the data sources and connection settings remain intact.

- To stop a client and permanently remove the data sources the client links to Tableau Online, right-click the Bridge icon in the system tray, and select Unlink.

Unlinking a client also removes all connection information from the client, including stored database credentials and Tableau Online account credentials.

Effects of exit and unlink

If you exit the client and the next refresh occurs while the client is temporarily stopped, the data source owner will see an alert in Tableau Online and be sent an email notification.
If you unlink a client, we recommend you delete the Bridge (legacy) schedules the client runs. For more information, see Delete the Bridge (legacy) schedule after unlinking a client, below.

Delete the Bridge (legacy) schedule after unlinking a client

When you unlink the client, you should also delete the Bridge (legacy) refresh schedules that the client runs. If a schedule is not deleted, the refresh will attempt to run as scheduled. In cases like this, you might receive refresh failure notifications.

1. Sign in to Tableau Online and navigate to the data source.
2. On the data source page, click the Extract Refreshes tab.
3. Select the check box next to the schedule and select Actions > Delete.

Permanently remove a client from a site

You can permanently remove a client from a site, which will make the client no longer visible when setting up a Bridge (legacy) schedule.

1. Sign in to Tableau Online and navigate to your Account Settings page.
2. Under Connected Clients, click Delete next to the client you want to permanently remove from the site.

Manage Email Alerts for Bridge

A scheduled refresh can fail for a variety of reasons. As a data source owner, it's important to be aware of these refresh failures so that you can troubleshoot any issues and minimize gaps in data freshness.

If enabled by your site admin, you will receive email alerts about refresh failures for all of the data sources that you own. When refreshes for your data sources are facilitated by Bridge (through Online refresh (formerly called Recommended) or Bridge (legacy) schedules), the type of alerts you receive, when you receive the alerts, and the alerts that you can configure will differ from Tableau Online alerts.
Note: This topic applies to Bridge data sources only. Email alerts about virtual connections from Bridge are not currently supported.

Differences with Bridge email alerts

- Unlike refreshes that run directly on Tableau Online, Bridge refreshes timeout after 24 hours (default). However, a timeout limit for refreshes can be increased (or decreased) through each Bridge client by a site admin. For more information, see Configure a timeout limit for refreshes.

- In addition to refresh failure emails, data source owners will receive email warnings for the following two scenarios:
  - **Bridge client is not running**: When an upcoming scheduled refresh can’t start because the client linked to the data source is not running.
  - **Incomplete refresh**: When a scheduled refresh hasn’t completed after a specified amount of time.

- For a particular data source, Tableau Online sends email about the first five consecutive refresh-related issues (i.e., refresh failures, alerts because the client is not running, or alerts because the refresh hasn’t completed yet) on the first day. If the data source continues to have refresh issues after the first day, Tableau Online sends one email per day.

- A data source owner can received up to 10 emails, one email per data source with active and consecutive refresh issues, in one day. The time period of one day is 24 hours starting at the time of the first refresh issue.

- Data refresh-initiated Subscription emails are not supported for views or workbooks that rely on Bridge extract data sources to keep data fresh. For more information, see Missing subscription emails.
Configure email alert for an incomplete refresh

For data sources that use Bridge (legacy) schedules, by default, a refresh email alert is sent 24 hours after the scheduled start time for a data source with an incomplete refresh. If a scheduled refresh completes within 24 hours of its scheduled start time, you will not see an email alert.

In some cases, you might want to be notified sooner than 24 hours. If a refresh is configured to use Bridge (legacy) schedule, you can configure the email alert to send after an amount of time that better aligns with the duration of a particular refresh.

1. Sign in to Tableau Online and navigate to your data source.

2. From the data source page, click the Extract Refreshes tab, and then click the Select All button.

   The email alert factors all the schedules for a data source when determining when to send the email alert even if you select only one schedule.

3. From the Actions menu, select Edit Refresh Email Alert.

4. In the Refresh Email Alert dialog box, specify the hours and minutes following a
scheduled refresh time that the alert should be sent, and click OK.

Considerations when managing alerts

- **Bridge (legacy) schedules only**: You can configure email alerts only for refreshes that are configured for Bridge (legacy) schedules.

- **One email alert per data source**: You can configure one refresh email alert for a data source. If a data source has multiple refresh schedules, the email alert is sent based on the next scheduled time across all schedules. Review the following two scenarios that demonstrate how the email alert timing works.

**Scenario 1**

Suppose you have an extract data source with one scheduled refresh set to run daily at 5 AM. For the purposes of this example, the refresh usually takes 30 minutes for Bridge to complete at that time of day.

If you specify 3 hours for the email alert, you will be sent an email at around 8 AM if the refresh hasn’t completed by that time.

**Scenario 2:**

Suppose you have the same data source from Scenario 1, with same time specified for the email alert against the following three schedules:
- Schedule 1 - runs daily at 5 AM
- Schedule 2 - runs twice a week, Tuesday and Thursday, at 1 PM
- Schedule 3 - runs once a week, on Saturday, at 12 AM

For the purposes of this example, though it can take as few as 30 minutes for Bridge to complete the refresh at 5 AM, during business hours, the refresh can take up to 3 hours to complete.

Like the first scenario, if the refresh for schedule 1 hasn’t completed by 8 AM, you will be sent an email. Regardless of the refresh for "schedule 1" being completed or not, you will be sent an email at around 4 PM on Tuesday if the refresh for "schedule 2" hasn’t completed. Similarly, regardless of what happened on Tuesday, if the refresh for "schedule 2" hasn’t completed by 4 PM on Thursday, you will be sent an email. Finally, if the refresh for "schedule 3" hasn’t completed by 3 AM, you will be sent an email.

- **Email alert time is based on the expected start time of the scheduled refresh**: The time you specify for the refresh email alert is the amount of time after the scheduled start time of the refresh. If you see email alerts too frequently or never at all, consider increasing the time to decrease email alert frequency or decrease the time to increase email alert frequency.

  The default is 24 hours.

- **Email alert can’t be turned off**: Though email alerts can’t be turned off, you can increase the time for an email alert so that the scheduled refresh completes before the email alert can be sent.

- **Refresh failure emails must be enabled**: In addition to refresh failure emails being enabled for the site (by the site admin), as the data source owner, you must also have refresh failure emails enabled for your account.

**Stop receiving email alerts when a client is not running**

By default, Tableau Online is configured to notify data source owners when scheduled refreshes can’t start because the Bridge client linked to the data source is not running.
There are two primary reasons why you might be receiving this email:

- The computer where the client is running from is not on.
- An extract data sources continues to be associated with a client that is no longer in use.

If any of these reasons apply to your situation, consider taking a few moments to: 1) make sure the machine where the client is installed on is on and the client itself is running and 2) if you’re a site admin, delete unused clients from the site. If you’re not a site admin, you can delete the data source from the client. For more information, see Scheduled refreshes appear to be running outside of schedule.

Troubleshoot Issues with Bridge

Different parts of the Tableau Bridge workflow require coordination with Tableau Desktop and Tableau Online. Depending on the task you’re trying to complete, the underlying data that you’re working with, and the data source’s connection (live or extract), and on the symptoms you’re seeing, some troubleshooting steps might require you to work in one or both of these respective products in addition to the client itself.

The issues and the steps to help resolve these issue might apply to data source owners or site admins.

Understand common issues after upgrade

After upgrading to Bridge, you might notice some changes to your Bridge-specific workflows.

Can’t configure 15 minute or 30 minute refreshes

Online schedules can only refresh as frequently as Tableau Online allows. If you need to refresh your data source more frequently, consider continue using Bridge (legacy) schedules instead.

Note: When using Bridge (legacy) schedules, the data source owner must be the same user that is signed into the client that is designated to refresh the data source. Depending on how
client management is administered in your organization, your site admin might need to take ownership of your data source.

**Can't find the "Refresh this extract on" or "Select where to run refreshes" button**

Beginning with Bridge 2020.2, Bridge schedules are better integrated with Tableau Online schedules and can be accessed and set up directly in the same location as Tableau Online schedules. For more information about Bridge schedules, see Set Up a Bridge Refresh Schedule.

**Can't find the Run Now option**

The Run Now option in Tableau Online is not available on individual data source pages for data sources that use Bridge (legacy) schedules. In most cases, a manual refresh of a data source that uses a Bridge (legacy) schedule can only be performed from the client that the data source is linked to.

**Can't refresh data sources that use Relationships**

Bridge 2019.4 (or earlier) does not support data sources created with Relationships in Tableau 2020.2 (or later). To keep your private network data fresh, make sure you're running the latest version of the client. To get the latest client, see Tableau Bridge Releases.

**Can't find "Schedule with Bridge Legacy" option**

Because Bridge cannot refresh data sources embedded in workbooks, the Schedule with Bridge Legacy option is not available from the workbook page on Tableau Online. To refresh data sources using Bridge (legacy) (or Online) schedules, republish the workbook with data sources published separately.

**Some data sources are not listed or missing from the client**

Data sources that use Online schedules or whose schedules have been migrated to use Online schedules are not visible from the client. As a site admin, you can monitor data sources with Online schedules using the Jobs page. For more information, see About Bridge Refresh jobs.
Data sources that use live queries and Bridge (legacy) schedules (which includes schedules created with Bridge 2020.1 and earlier) continue to display in the client.

Locate Bridge

If you can't find the Bridge client or the option to use Bridge, try one or more of the suggestions below.

Can't find the Bridge installer

To download the client, go to Tableau Bridge Releases page on the Tableau website and click the download button. For more information about the Bridge installer and the installation process, see Install Bridge topic in the Tableau Online Help.

Can't find Bridge on my machine

After installing the client on your machine, you can do one of the following tasks to open the client:

- Double-click the Bridge shortcut ( ) on your desktop.
- From your desktop, in the Windows system tray, click the Bridge icon ( ).
- Using Windows file explorer, search Tableau Bridge to locate the client.
- If Tableau Desktop is installed on the same machine as the client, open Tableau Desktop and select Server > Start Tableau Bridge Client.

Note: This task opens the correct client if you’re using Tableau Desktop 2018.2 and later. If you're using Tableau Desktop 2018.1 and earlier, using the Start Tableau Bridge Client option will cause an older version of the client to open.

Can't find the Bridge option in the publishing dialog

The reason you might not see Bridge option in the publishing dialog depends on what you are publishing to Tableau Online: a data source or a workbook.
If you're publishing a data source:

- The data source is file-based. Therefore, the option to use Bridge displays after you have successful published the data source to Tableau Online.

  After you successfully publish the data source, you see the Publishing Complete dialog, which allows you to schedule refreshes for your file-based data source using Bridge while on Tableau Online. For more information about scheduling refreshes using Bridge while on Tableau Online, see Set Up a Bridge Refresh Schedule.

- The data source connects to data that Tableau Online can reach directly.

  If Tableau Online can reach the data directly, you don't need to use Bridge to keep the data fresh. For a list of connectors that Tableau can use to reach the data directly, see Allow Direct Connections to Data Hosted on a Cloud Platform.

- The data source connects to data that is not supported by Bridge.

  For a list of connectors that Bridge can support, see Supported connectivity.

If you're publishing a workbook:

- The workbook contains an embedded data source that must be published separately.

  To publish the data source separately, in the Publish Workbook to Tableau Online dialog box, click Edit under Data Sources. Under the Publish Type drop-down, select
Resolve installation issues

Using macOS or Linux

Bridge is not supported on macOS or the Linux operating system. To use Bridge, you must use a Windows machine. For more information about other system requirements, see Connectivity with Bridge.

Local admin on the machine

The Windows user account you’re logged in to must be a member of the local Administrators group. For more information about minimum installation requirements, see Before installing Bridge. For more information on system requirements, see About the Bridge Client.
Resolve sign-in issues

**Working with multiple Tableau Online sites or Bridge is signed in to the incorrect site**

Make sure you're entering the correct user name and password for the Tableau Online site that the client is associated with. If you suspect that an incorrect user name and password is saved for a site or that the client is signed in to the incorrect site, use the **Unlink** option in the client to remove its association with the site and to clear the password.

Identify causes for scheduled refresh issues

There are several symptoms that can indicate that scheduled refreshes are not performing as expected. Symptoms might include, but not limited to, the following:

- As the site admin or data source owner, you see an alert on Tableau Online that a scheduled refresh could not complete.
- As the site admin or data source owner, you receive an email notification from Tableau indicating that a Bridge refresh could not complete.
- As a data source owner, you receive an email notification from Tableau indicating that a Bridge refresh could not start on schedule because the Bridge client is not running.
- You see an alert in the client next to the data source whose refresh could not complete.
- Outdated data in the view.

If any of the above symptoms apply to your situation, follow the procedure below. If the procedure doesn't resolve your issue, then try one or more of the tasks below the procedure to help identify the cause of the refresh issue.

1. Open the client, click the data source, and then click the **Details** button to review the error message.

2. If the error message doesn't provide enough information to resolve the refresh issue, go to the **Tableau Knowledge Base** and search for the refresh issue.

**Important:** If you see the "There was a problem and the data engine could not start properly" error message and you're running client version 2018.2-2018.3, Tableau strongly...
Tableau Online Help

recommends upgrading to version 2019.1 or later. For more information, see Error "There was problem and the data engine could not start properly" article in the Tableau Knowledge Base.

If the Tableau Knowledge Base doesn't address your specific issue, then try one or more of the following tasks:

- **Validate authentication information in the client**: If a data source requires authentication, ensure that the correct database credentials are being reference by the client, even if the database credentials are already referenced in Tableau Online. For information about embedding database credentials in the client, see Embed or update database credentials for Bridge (legacy).

- **Upgrade the client**: Upgrade to the latest version of the client. You can get the latest version of the client from the Tableau Bridge Releases page on the Tableau website. For more information about installation, see Install Bridge.

  **Note**: Because of an issue that’s preventing Bridge 2018.2-2018.3 from performing extract refreshes, Tableau strongly recommends that you upgrade to Bridge 2019.1 or later.

- **Make sure that the client is running**: Log onto the machine where client is installed and make sure the client is running. After you verify the client is running, you can run a manual refresh of the data source or wait until the next scheduled refresh.

- **Confirm file-based data source uses UNC path**: If you’re working with a file-based data source using Bridge (legacy) schedules, ensure that the client references the UNC path. For more information, see Change the file path for a data source.

- **Confirm whether Application mode or Service mode requirements are met**: If the client is set up to run in **Application** mode, you must be logged onto the machine where the client is running in order for scheduled refreshes to complete. If your client is set up to run in **Service** mode, you don’t have to be logged on to the machine where the client is running. However, the machine must be on.

- **Confirm that all connections in the data source are supported by Bridge**: 


If refreshing a multi-connection data source (that is, a data source that uses a cross-database join), make sure all connections in the data source are supported by Bridge. If one or more connections are not supported, Bridge is unable to refresh the data source until the unsupported connection is removed. For a list of supported connectors, see Supported connectivity. To remove a connection from a data source, you must edit the data source in Tableau Desktop. For more information, see Editing a Published Data Source in the Tableau knowledge base.

- **Manually refresh the data source**: Manually refreshing the data source can help determine whether the issue is caused by the client or by a different part of the Bridge workflow, such as publishing from Desktop or the data source itself.

  - **From the client** - To determine if the issue is isolated to the specific scheduled refresh or all scheduled refreshes managed by the client, do a manual refresh of the published data source from the client.
    
    1. Open the client.
    2. Hover over the data source whose schedule refresh is not working, and click the Run Now icon ( ⚡ ) to manually start a refresh.

    If the manual refresh is successful, you have a temporary workaround for the refresh issue. If the refresh is unsuccessful, review the error in the client to help resolve the issue.

  - **From Tableau Desktop** - To determine whether or not the issue is a client issue or an issue with the published data source, you can do a manual refresh of the data source from Tableau Desktop.
    
    1. Open Tableau Desktop.
    2. In the Connect pane, click **Tableau Server** and connect to the published data source that is not refreshing.
    3. From the Data menu, select the data source and then select **Tableau Data Server > Refresh from Source**.
If the refresh from source is successful, you have temporary workaround for the refresh issue. If the refresh is unsuccessful with the same error that shows in the client, contact Tableau Technical Support on the Tableau website.

- **From Tableau Desktop, create a local copy of the data source** - To determine that the issue is not with the publishing process or with Tableau Online in general, first create a local copy and then manually refresh the published data source.
  1. Open Tableau Desktop.
  2. In the Connect pane, click **Tableau Server** and connect to the published data source that is not refreshing.
  3. From the Data menu, select the data source and then select **Create Local Copy**.
  4. From the Data menu, select the local copy of the data source and then select **Refresh**.

  If refreshing from a local copy of the data source is successful, you have a temporary workaround for the refresh issue. The issue is likely with the publishing process.

- **Refresh the data source using the Tableau Extract Command-Line Utility**: Refreshing the data source using the Tableau Extract Command-Line Utility is another method for isolating whether the issue is specific to the client or with the data source or other part of the Bridge workflow. This method can also provide an automated or temporary way of refreshing the extract. For more information about setting up and using the Tableau Extract Command-Line utility, see Automate Extract Refresh Tasks from the Command Line.

  If the refresh is successful through the command line utility, you have a temporary workaround for the refresh issue. If the refresh is unsuccessful, contact Tableau Technical Support on the Tableau website.

- **Scheduled refreshes appear to be running outside of schedule**:
After Tableau Online’s upgrade to 2019.2, a data source owner might receive multiple email notifications when an upcoming scheduled refresh can’t start because the client is not running. Because a data source owner can receive up to five consecutive email notifications per day for up to ten data sources that they own, it might appear the scheduled refreshes are running outside of their scheduled times. As a data source owner, you might be receiving the notifications for the following reasons:

- **The machine where the client is running from is not on.** To stop notifications in this scenario, make sure the machine where the client is installed on is on and the client itself is running before the upcoming scheduled refresh is to occur. Alternatively, if the extract data source doesn’t need to be refreshed regularly, consider removing the schedule and manually refreshing it from the client when needed. For more information about removing a schedule, see Stop Keeping Data Fresh Through Bridge.

- **Extract data sources continue to be associated with a client that is no longer in use.** To stop notifications in this scenario, as a site admin, you can delete the client from the site. For more information, see Permanently remove a client from a site.

  If you’re not a site admin, consider the following:
  - If the extract data source doesn’t need to be refreshed, you can remove the data source from the client. For more information, see Remove a data source from a client.
  - If the extract data source needs to be refreshed, albeit infrequently, you can change the client associated with that extract data source (and its schedule). For more information, see Change the Bridge Client Settings.

**Refreshes stop responding for data sources that use JDBC-based connections**

**Note:** Bridge provides limited support for data sources that use JDBC drivers to connect to unsupported databases. For more information, see Limited connector support.

Refreshes for extract data sources whose connections rely on JDBC-based drivers can fail with timeout errors or the refreshes themselves stop responding, or hangs, because of CPU or RAM spikes. In most cases, these refresh issues can occur when there are several concurrent refreshes of data sources that use JDBC-based connections being handled by a
client on a machine that does not have sufficient hardware to support the resource-intensive JDBC-based connections. To help resolve this type of issue, review the following suggestions:

- **If you’re a site admin managing the clients in your organization**, review the log files, \( jprotocolserver_{<process\_id>} \) and \( stdout\_jprotocolserver_{<process\_id>} \), in the Logs folder in the My Tableau Bridge repository. Then, consider doing one of the following:
  - Reduce the number of concurrent refreshes allowed by the client. For more information, see Manage the size of the Bridge pool.
  - Consider increasing CPU cores and RAM on the machine running the Bridge client to better handle the resource intensive JDBC-based connections.

- **If you’re the data source owner**, update the data sources to use a Tableau built-in connector instead. For more information, see Supported Connectors in the Tableau User Help.

**Refresh issues after changing network type**

After updating the network type associated with a data source, from Tableau Online to Private Network or Private Network to Tableau Online, existing schedules associated with the data source must be recreated. For more information, see About switching network types.

**Refresh issues on file-based data published from Tableau Desktop on a Mac**

When using 1) Tableau Desktop on a Mac, 2) publishing a file-based data source from a Windows network file share, and then 3) configuring an Online schedule, the refreshes will fail. If this file-based data source is business critical resource for your organization, consider configuring a Bridge (legacy) schedule instead. For more information, see Set up a Bridge (legacy) schedule.

**Identify causes for live query issues**

Issues around live queries are typically due to the option not being enabled or that Bridge doesn’t support the data source type.
No "Live" data sources listed in the client

A few things need to happen in order for "Live" data sources to display in the client. First, the site admin has to enable pooling for the site. Second, the site admin must also add at least one client to the pool. Finally, the data source must be published with a live connection. All three factors need to happen in order for "Live" data sources to display in the client.

The option to publish with a live connection or the "Maintain connection to a live data source" option during publishing is missing

The option to use Bridge to support live queries for an private network data source must be enabled by your Tableau Online site admin through pooling. If the option is not available to you during publishing, consider contacting your site admin to enable the option. If you’re a site admin, see Configure the Bridge Client Pool.

You’re prompted for database credentials

If the data source requires authentication by the database, the credentials must be embedded in the data source at the time of publishing. If the credentials are not embedded in the data source at the time of publishing, the credentials can be added to the published data source on Tableau Online.

1. Sign in to Tableau Online and navigate to the data source.
2. From the data source page, on the Connections tab, select the check box next to the connection.
3. From the Actions menu, click Edit Connections.
4. Select the Embedded password in connection and enter the necessary database
You’re working with a file-based or statistical file-based data source

Bridge doesn’t support data sources with live connections to file-based and statistical file-based data sources. To keep data fresh for these types of data sources, you can publish extracts and set up a refresh schedule for each data source instead. For a list of connectors that Bridge supports, see Supported connectivity. For more information about setting up refresh schedule, see Set Up a Bridge Refresh Schedule.

Data source doesn’t display as "Live" in the client:

If the data source doesn’t show as "Live" in the client, the data source was likely published as an extract. To validate that the data source was published as an extract, follow the steps below.

1. Sign in to Tableau Online and navigate to the data source.
2. On the data source page, check whether the data source has an "Extract Refreshes" tab or an extract icon ( ). If the data source shows the tab then it was published as
To resolve the issue, republish the data source from Tableau Desktop, ensuring that you select the **Maintain connection to a live data source** option. This option tells Bridge to maintain a live connection to your data.

![Publish Data Source to Tableau Online](image)

- **Create an extract and schedule a refresh**
- **Maintain connection to a live data source**

**More Options**
- **Update workbook to use the published data source**

![Tableau Online Help](image)
**Client is running Application mode**

If you’re using Bridge 2018.2 and later, after the site admin has enabled pooling, live queries are supported in both Application and Service modes. However, if the client is running Application mode, you must be logged on to keep data fresh.

If you’re using Bridge 2018.1 and earlier, even if live queries are enabled by the site admin, Bridge can’t support live queries in Application mode. The client must be running in Service mode to support live queries.

For more information about running the client in Application mode or Service mode, see Application versus Service mode.

**Understand other common issues**

**Delay before list of data sources populate in client**

There is a short delay, usually several seconds, populating the list of data sources in the client. This is expected behavior. The client is contacting Tableau Online to get the list of data sources before it can display that information.

"No linked data found" in the client

If the client shows a green indicator and "Connected" status, but also shows a "No linked data found," review the suggestions below based on the type of data source you’re expecting to see.

If you’re expecting to see an extract data source that uses a Bridge (legacy) schedule listed in the client, try the following:

- Validate that the extract refresh schedule is assigned to the correct client. For more information, see Change the Bridge Client Settings.

If you’re expecting to see a data source with a live connection or an extract data source that uses Online schedules, try one or more of the following:
• Validate that the data source was published with a live connection.
  1. Sign in to Tableau Online and navigate to the data source.
  2. From the data source page, check whether the data source has an "Extract Refreshes" tab or a extract icon ( ). If the data source shows the tab then it was published as an extract.

• Make sure at least one client is part of the pool to facilitate data sources with live connections. To do this, contact your site admin. If you’re the site admin, verify that you've enabled pooling for the site and client. For more information, see Configure the Bridge Client Pool.

**Red indicator and "Disconnected" status in the client**

If the client shows a red indicator and "Disconnected" status, try the following tasks, in the order listed:

  1. In the client menu, click Repair.
  2. If step 1 doesn't resolve the issue, from the Mode drop-down menu, select Application and wait a few seconds. Switch back to Service and wait a few more seconds.
  3. If step 2 doesn't resolve the issue, restart the machine. Make sure that there are no scheduled refreshes that are in progress.

In some cases, the client shows a red indicator and "Disconnected" status if the client is running on a machine that is "locked down." This means that the client is restricted to connecting to a minimum set of domains. For a list of the minimum set of domains that the client needs to connect to in order to work, see Additional security considerations.
Missing subscription emails

Data refresh-initiated Subscriptions are not supported for views and workbooks that rely on Bridge to keep data fresh. This means you do not receive subscription emails when the following are true: 1) subscriptions are configured for When Data Refreshes and 2) the views or workbooks you're subscribing to rely on extract data sources that refresh using Bridge. To use subscriptions in this scenario, consider configuring your subscriptions to use On Selected Schedule instead. For more information, see Troubleshoot Subscriptions.

"Test Connection" button is grayed out

When editing a connection on Tableau Online, the Test Connection button might be grayed out. In some cases, this button is grayed out because the connection uses custom SQL or initial SQL. As an alternative to testing your connection with this button, consider running a manual refresh to test the connection instead. For more information about running a manual refresh, see Start a Refresh Task Manually.

Understand common errors

While using Bridge, you might see one of the following errors.

"An error occurred while communicating with Tableau Server: Tableau Bridge does not have a client configured for your site to handle live connections." or "Cannot connect to database"

This is an error that you might see when connecting to a published data source whose data freshness is being facilitated through Bridge. To resolve these errors, try the following tasks in the order listed.

- Make sure the client is added to the pool. To do this, contact your site admin. If you're a site admin, verify that you've enabled pooling for the site and at least one client. For more information, see Configure the Bridge Client Pool.

- Make sure the client shows a green indicator and "Connected status. If it shows a red or "Disconnected" status, see Red indicator and "Disconnected" status in the client.
"This data source requires a correct file path" or "Unable to refresh data source because of an unsupported operation"

If you're working with a file-based or statistical file-based data source (that uses Bridge (legacy) schedules) you might see this error because the path referenced by the client is the mapped drive path instead of the UNC path. To resolve this issue, you must update the file location path in the client. For more information, see Change the file path for a data source.

While refreshing on Tableau Online, you might see the following error:

"Error: Failed to queue n tasks"

This error can occur if you've selected to use the Run Now option on multiple data sources and one or more data sources connect to file data. The Run Now option can only be used for data sources that use Online schedules.

Virtual connections

While trying to create a virtual connection, you might see one of the following errors:

- **INVALID_ARGUMENT**:

  "INVALID_ARGUMENT: Can't display the view because of Tableau Online site settings that affect the data source used by this view. Contact your site administrator to connect at least one Tableau Bridge client to the site."

  This error can occur when there are no Bridge 2021.4 clients in a pool to perform data freshness tasks for virtual connections that connect private network data. To resolve this error, contact your site admin to ensure that version 2021.4 clients are running and in a connected state, and the pool is mapped to the domain where the underlying data is located.

- **UNKNOWN**:
"UNKNOWN: There was an unknown connection error to the database. The error message below has additional information, but you might need to ask the database administrator to review the database logs."

This error can occur when the domain where the underlying data of the virtual connection is located does not map to a specific Bridge pool. To resolve this error, contact your site admin to ensure that the domain where the underlying data is located is mapped to a Bridge pool and at there is at least one Bridge 2021.4 client running, in a connected state, and is assigned to a pool.

Prepare and send log files to Tableau Technical Support

If the troubleshooting steps in this article don't help isolate or solve the issue you're having with Bridge, you can contact Tableau for help. Before you contact Tableau for help, consider following the steps below to gather and send the necessary Bridge client log files that Tableau will need to diagnose and help resolve the issue.

Prepare clean log files

1. On the machine, close the client:
   - If your client is running Application mode, from the client menu, select Exit.
   - If your client is running Service mode, change the client to Application mode, and then from the client menu, select Exit.

2. Go to and open the My Tableau Bridge Repository folder.
   The default location of the My Tableau Bridge Repository folder is C:\Users\jsmith\Documents\My Tableau Bridge Repository.

3. In the My Tableau Repository folder, rename the Log folder. For example, Logs_archive. By changing the name of this folder, the client will create a new "Logs" folder.

4. Open the Command Prompt as an admin.

5. Change to the Tableau Bridge bin folder. For example: C:\Program
Files\Tableau\Tableau Bridge\bin.

6. Run the following command: `TabBridgeClient.exe -DLogLevel=Debug`

**Note:** The above command is case-sensitive. If the command is not typed exactly as written, the log files will not capture the issue at the level of detail that is necessary to help diagnose the issue.

After this step, the client opens automatically.

Reproduce the issue

After you prepare the client to create new log files, try to reproduce the issue you’re having with Bridge. By reproducing the issue, the new log files can capture specific details about the issue. These details are essential for Tableau to have in order to isolate, diagnose, and resolve the problem.

Send log files

1. After the issue has been reproduced, right-click the Bridge icon in the Windows system tray and select **Exit** to stop Bridge. This step ensures that all errors are recorded in the log file.

2. Using Windows file explorer, go to and open the **My Tableau Bridge Repository** folder.

3. Right-click the **Logs** folder and select **Send to > Compressed (zipped) folder**.

4. Contact **Tableau Technical Support** on the Tableau website.

**Note:** If the .zip file you created in step 2 is larger than 5 MB, see Sending Large Files in the Tableau Knowledge Base.

5. Locate and start Bridge. If the client was previously running in Service mode, ensure that **Service** is selected in the client.
Plan Your Bridge Deployment

As a site admin, if you're setting up Tableau Bridge for the first time or upgrading, there are a set of recommendations, best practices, and planning tasks to follow to optimize Bridge for your organization.

For an general overview of Bridge, see Use Bridge to Keep Data Fresh.

Before deploying Bridge

Before you deploy Bridge, review the following information to help you, as the site admin, understand the different components of Bridge, how these components work together, and how they impact your Bridge deployment.

Bridge software

Bridge is stand-alone software, provided at no additional cost, to use in conjunction with Tableau Online. Bridge is a thin client that you install behind a firewall to enable connectivity between private network data and Tableau Online.

In most cases, you will own the set up and management of several clients, or pools of clients, in your organization. For more information, see Management models.

Recommended version

To take advantage of the latest security and feature updates, always install the latest version of the Bridge client from the Tableau Bridge Releases page. For more information, see the Install Bridge topic.

Notes:

- Clients can only be registered to one site at a time.
- There is no limit on how many clients that can be registered to a site.
Database drivers

To facilitate connectivity between private network data and Tableau Online, Bridge requires drivers to communicate with some databases. Some driver software is installed with the client. Other driver software must be downloaded and installed separately. For more information, see the Install Bridge section in the Install Bridge topic.

Recommended software and hardware

Bridge is designed to scale up and scale out. When configuring your Bridge deployment, consider the following:

- For a smaller pool of clients running on higher specification machines, each client can be scaled up to run more scheduled refresh jobs in parallel.

- For a larger pool of clients running on lower specification machines, though each client can run fewer refresh jobs in parallel, each client still provides high throughput and capacity for the pool as a whole.

For more information about pooling, see Pooling capacity.

Operating systems and more

Bridge can be installed on any supported version of the Microsoft Windows operating system.

Only one Bridge client should be installed per operating system.

- Microsoft Windows 10 or later, 64-bit
- Windows Server 2012 or later
- CPUs must support SSE4.2 and POPCNT instruction sets
- 2 GB memory
- 1.5 GB minimum free disk space

Additional hardware guidelines
The following table shows additional hardware guidelines for virtual environments running Bridge. These guidelines are based on the number of concurrent refreshes you need each client to be able to run in parallel.

<table>
<thead>
<tr>
<th>Refreshes running in parallel per client</th>
<th>&lt;=5</th>
<th>&lt;=10</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCPU</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>RAM</td>
<td>16 GB</td>
<td>32 GB</td>
</tr>
<tr>
<td>NVMe SSD</td>
<td>150 GB</td>
<td>300 GB</td>
</tr>
</tbody>
</table>

**Virtual environments**

All of Tableau’s products operate in virtualized environments when they are configured with the proper underlying Windows operating system and minimum hardware requirements.

- Citrix environments (non-streaming)
- Microsoft Hyper-V
- Parallels
- VMware
- Microsoft Azure
- Amazon EC2

**Required accounts**

There are two types of accounts that your Bridge deployment requires: a Windows service account and a Tableau Online account.

**Windows services account**

Bridge clients can run in one of two modes: Application or Service. To run the client in Service mode, a Windows services account is required. Service mode allows the client to run continuously without a dedicated logged on user. Service mode is recommended to support 1) data sources or virtual connections with live connections to private network data, and 2) load balancing (pooling) of clients. For more information about each mode, see About the Bridge Client.
Important: We recommend that no more than 10 clients run under a single Windows services account.

Tableau Online account

Tableau Online authenticates the client by the user that is signed in to and managing the client. Therefore, a Tableau Online site admin account is necessary to perform certain management tasks, like adding or removing a client from a pool, both on the client and Tableau Online site.

One of the following site roles is required to manage Bridge:

- Site Administrator Creator
- Site Administrator Explorer

The non-administrator site roles, Creator and Explorer can publish data sources, refresh data, and use Bridge to facilitate the live and extract connections between Tableau Online and private network data. The Creator or Explorer role and Data Management is required to publish virtual connections and refresh data with Bridge.

Supported connectivity

When planning your deployment, as the site admin, it’s important to know what data your users are connecting to, the type of connections they’re using, and how those connection types affect how data sources or virtual connections can be managed.

Data types

Tableau Online supports connectivity to data hosted on a cloud platform—data typically accessible from the public internet or outside the firewall. For data accessible only from a private network (inside the firewall), Bridge must be used.

Private network data that Bridge supports falls into three general categories:

- **Relational data**—examples include Microsoft SQL Server, MySQL, PostgreSQL, Oracle, Teradata, or even PostgreSQL hosted in Amazon RDS
- **File data**—examples include Microsoft Excel, text, and statistical files
• **Some cloud data** (accessible only from a private network)—examples include Redshift, Teradata, and Snowflake

After a connection to the private network data is made, the connection information is saved with the Tableau data source or virtual connection. Bridge uses that connection information to facilitate connectivity between the private network data and Tableau Online.

**Data connections**

Bridge supports data sources or virtual connections that use connections between private network data and Tableau Online. A data source or virtual connection can use one of two connection types:

• **Live (also known as live query):** Data sources set up to use live connections enable real-time updates of the data. This means any changes to the underlying data is reflected, via Bridge's live queries, in the data source (or workbook that uses that data source) or virtual connection published to Tableau Online.

• **Extract:** Data sources set up to use extract connections enable snapshots of the data. These snapshots can be refreshed on a schedule, via Bridge's Online refresh (formerly called Recommend) or Bridge (legacy) schedules, to capture any changes to the underlying data. These snapshots are then pushed to the data source (or workbook that uses that data source) or virtual connection published to Tableau Online. For more information about the schedules, see Data freshness.

Support for these connection types depend on the data that the data source or virtual connection is connected to. Bridge supports live queries for most relational data. For other data, including file data, only extract connections are supported. For more information, see Bridge exceptions.

**Data freshness**

Bridge keeps data sources or virtual connections up to date using live queries and refresh schedules.
For data sources or virtual connections set up to use extract connections, Bridge uses refresh schedules. There are two types of schedules that can be created by content owners to keep data fresh: Online and Bridge (legacy).

- **Online** schedules allow content owners to manage Bridge data sources directly from Tableau Online.

  Beginning with Bridge 2021.4.3, file-based data sources can be refreshed using Online schedules.

- **Bridge (legacy)** schedules require a designated client to perform the refresh. A client can be designated to perform the refresh by the data source owner. The data source owner can only assign a Bridge (legacy) schedule to a client that he or she is already authenticated or signed into using his or her own Tableau Online credentials.

Depending on the schedule type, different refresh concurrency is supported. For more information, see Pooling capacity.

**Compare schedules**

The following table delineates the primary differences between Online and Bridge (legacy) schedules for keeping private network data fresh.

<table>
<thead>
<tr>
<th>Supported data types</th>
<th>Online Schedule</th>
<th>Bridge (Legacy) Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational data</td>
<td>Relational data</td>
<td>Site admin or data source owner (depending on who is designated to own the client management tasks)</td>
</tr>
<tr>
<td>File data</td>
<td>File data</td>
<td>Site admin or data source owner</td>
</tr>
<tr>
<td>Private cloud data</td>
<td></td>
<td>Site admin or data source owner (depending on who is designated to own the data source management)</td>
</tr>
</tbody>
</table>

**Content management**

<table>
<thead>
<tr>
<th>Online Schedule</th>
<th>Bridge (Legacy) Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source owner</td>
<td>Site admin or data source owner (depending on who is designated to own the client management tasks)</td>
</tr>
<tr>
<td>Virtual connection owner</td>
<td></td>
</tr>
</tbody>
</table>

**Client management**

<table>
<thead>
<tr>
<th>Online Schedule</th>
<th>Bridge (Legacy) Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site admin</td>
<td>Site admin or data source owner (depending on who is designated to own the data source management)</td>
</tr>
</tbody>
</table>
Data access and authentication

The underlying data that a data source or virtual connection connects to often requires authentication. If authentication is required, the publisher or owner can configure how the database credentials are obtained.

For data sources

The authentication configuration options for data sources are: **Prompt user** or **Embedded password**.

If the data source is set to prompt users, database credentials are not stored with the connection. This means, a user who opens the data source (or workbook that uses the data source) must enter his or her own database credentials to access the data. If a data source is set up with the password embedded, database credentials are saved with the connection.
and used by anyone who accesses the data source (or workbook that uses the data source). For more information, see Set Credentials for Accessing Your Published Data.

**For virtual connections**

Database credentials are stored with a virtual connection's connection and used by anyone who accesses the virtual connection.

**Content management**

In most cases, the site admin owns and manages the Bridge clients. Content owners manage the data sources or virtual connections themselves for tasks that range from publishing to updating database credentials and refresh schedules.

**Note:** Regarding data sources, Bridge can only keep data fresh for published data sources, i.e., data sources published separately from workbooks. Bridge can't keep data fresh in embedded data sources, i.e., in data sources that are embedded in a published workbook.

**Management models**

Although there are no constraints on how to set up and manage Bridge in your organization, your Bridge deployment will likely fall into one of two common management models. The management model you use, as the site admin, depends on the type of schedules that your Bridge deployment needs to support.

**Centralized management**

A centralized management model supports pooling of clients and is optimized for keeping data, in multiple private networks, fresh. Because of pooling, live queries and refresh jobs happen in parallel across available clients.

For example, if you have 20 refreshes and have five clients that are running and available, you can expect each client to be allocated to run four refresh jobs each.
Using this model means:

- As the site admin, you can set up and take down Bridge clients as needed.

- For content owners, this means they can 1) have uninterrupted publishing workflows that detect whether Bridge is needed, 2) edit or update database credentials from Tableau Online directly, and 3) schedule refreshes from Tableau Online directly.

Mixed management

A mixed management model is an option if Bridge facilitates connectivity for data sources that use Bridge (legacy) schedules. With this model, in addition to the benefits of the centralized management model, “named” or designated clients must be managed separately.

With this model, the owner of the data source and the user authenticated into and managing the client must be the same. Therefore, the owner of the client can be one of two types of users: data source owner or site admin.

- **Data source owner**: The data source owner should be the client owner if you want him or her to perform data source management tasks on his or her own. Data source management tasks include updating refresh schedules and updating database credentials that are saved with the client.

- **Site admin owner**: You must be the client owner if you want to retain all client management responsibilities. This means, you must assign ownership of the data source to yourself, effectively making you the new data source owner. You are then responsible for all data source management tasks associated with owning data sources.

**Note**: Bridge (legacy) schedules do not support refreshes for virtual connections.

Using this model means:

- When scheduling refreshes, data sources need to be assigned to a specific client. When scheduling a refresh, the client is only visible to the data source owner if he or she is signed into the client itself under the same Tableau Online account.

- If the data source owner maintains ownership of his or her data sources, he or she
must own the management of the client that refreshes those data sources.

- If you, as the site admin, want to maintain ownership of the client, you must also own the data sources that are assigned to the specified client.
- Only one refresh can happen at a time for data sources. If you need refreshes to happen at the same time, consider designating additional “named” clients to support higher throughput.

Pooling capacity

By default, data freshness tasks, live queries and data sources or virtual connections that use extract connections refreshed with Online schedules, are distributed and load balanced across available clients in a pool.

<table>
<thead>
<tr>
<th>Data Freshness Task</th>
<th>Pooling Support</th>
<th>Concurrency Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live query</td>
<td>Yes</td>
<td>16 live queries per client</td>
</tr>
<tr>
<td>Extract connection - Online refresh (formerly called Recommended) schedule</td>
<td>Yes</td>
<td>10 refreshes per client (can be configured)</td>
</tr>
<tr>
<td>Extract connection - Bridge (legacy) schedule</td>
<td>No</td>
<td>1 refresh per client</td>
</tr>
</tbody>
</table>

Scheduling capacity

Because Bridge clients can easily be connected and disconnected, you can leverage scripts to schedule Bridge capacity (i.e., the number of running client machines) in advance of anticipated data freshness workloads.

For example, if your Bridge clients run on virtual machines on AWS, the following AWS resources can help you get started with scheduling:

- AWS Instance Scheduler
- How do I stop and start my instances using the AWS Instance Scheduler?
- How do I stop and start Amazon EC2 instances at regular intervals using Lambda?
Timeout limits

Live queries have a timeout limit of 15 minutes. This limit is not configurable. Refreshes have a default timeout limit of 24 hours and is configurable by client. For more information, see Configure a timeout limit for refreshes.

Bridge exceptions

There are some exceptions that you and your users should be aware of when using Bridge. The following list summarizes some of those exceptions.

- For specific connectivity exceptions, see Unsupported connectivity.
- For client management model exception, see Mixed management.

Deploy Bridge

The steps to install and set up Bridge are simple. However, there are a few additional things you must do before you proceed with your deployment.

New Bridge deployment

Centralized management

To deploy Bridge using the centralized management model, do the following:

1. For each machine, log on using your Windows services account, and install the latest client.

2. After installation, sign in to the client using your Tableau Online site admin credentials to ensure that the client is running under Service mode (on by default).

3. Open a browser, sign in to Tableau Online using your site admin credentials and go to the Bridge settings page to ensure:
   a. Installed clients are properly linked to the site.
   b. Clients are part of the client pool (on by default for clients running Bridge 2020.2)
4. **Monitor** the Bridge live queries using **Bridge Connected Data Sources** admin view, and refresh jobs from the **Jobs** page on Tableau Online.

**Mixed management**

To deploy Bridge using the **mixed management** model, do the following:

1. For each machine, log on using your Windows services account, and install the latest client.

2. After installation, sign in to the client using your Tableau Online site admin credentials to ensure that the client is running under **Service mode** (on by default).

3. Open a browser, sign in to Tableau Online using your site admin credentials and go to the Bridge settings page to ensure:
   a. Installed clients are properly registered to the site.
   b. Clients are part of the client pool (on by default for clients running Bridge 2020.2 and later).

4. To support data sources that use Bridge (legacy) schedules, do one of the following:
   - If the publisher will own and manage their own data sources, ensure that the data source owner installs the latest client on their machine before any data source publishing takes place.
   - If you will own and manage both the data sources and clients associated with those data sources:
     i. Set up another machine and client to designate for refreshing data sources.
     ii. Sign in to that client using your Tableau Online site admin credentials.
     iii. Open a browser, sign into Tableau Online using your site admin credentials.
credentials and go to the Bridge settings page to ensure:

i. Installed clients are properly recognized and registered to the site.

ii. Clients are not part of the pool.

iv. **Change ownership of the published data sources** that need to be refreshed with your Bridge client to yourself.

v. After you change ownership of the data sources, **change the client associated with the refresh**.

vi. Log on to the machine running the client and open the client.

vii. For each new data source assigned to your client, **enter the database credentials** that the client needs to connect and refresh the data source.

5. **Monitor** the Bridge live queries using **Traffic to Bridge Connected Data Sources** admin view, and refresh jobs from the **Jobs** page on Tableau Online.

Next steps

After you have Bridge set up and running in your organization, your users can start connecting to private network data, publishing data sources or virtual connections to Tableau Online, and keep data fresh.

Existing Bridge deployment

Deploying Bridge 2021.4 (or later)

As with previous releases, the enterprise improvements in this release are designed to complement your existing Bridge deployment. As with other deployments, we recommend the following steps below.

Step 1: Add new 2021.4 (or later) clients first

The latest updates to Bridge include more flexibility and control over Bridge pools, Online schedules support for file-based data sources, and private network data freshness support
for virtual connections. For more information about these changes, see the following in the What’s New in Tableau Online:

- What’s New in Tableau Online

Special notes about the latest release:

- Support for Online schedules for file-based data sources is available with Bridge 2021.4.3.

- Sites with pooling configured before Tableau 2021.4 have clients assigned to the Default Pool by default. The default pool's domain can’t be configured to access a specific private network. To reduce the scope of access of this pool and to enable more advanced scheduling capabilities, we recommend you create new pools and map them to specific domains. For more information, see Step 2: Configure a pool.

- Because Bridge pools are mapped to and refresh data from specific domains, we strongly recommend that extract data sources that contain connections to multiple domains be updated in one of the following ways:
  - Consolidate underlying data locations so that the connections are in the same domain
  - Change the connection type of each connection to use liver query
  - Convert each connection to a data source

- When using 1) Tableau Desktop on a Mac, 2) publishing a file-based data source from a Windows network file share, and then 3) configuring an Online schedule, the refreshes will fail. If this file-based data source is business critical resource for your organization, consider configuring a Bridge (legacy) schedule instead. For more information, see Set up a Bridge (legacy) schedule.

- Existing data sources, including all file-based data sources, that are already configured with Bridge (legacy) schedules and associated with specific clients will continue to run as expected. Important: Support for Bridge (legacy) schedules will be removed in a future release. To ensure a smooth transition, we recommend you use Online refresh schedules.
New live queries and extract data sources that use the Online schedules will default to using 2021.4 (or later) clients and new capabilities.

Step 2: Create new pools, map domains to a pool, and assign version 2021.4 clients to pools

Follow the procedures described in Step 2: Configure a pool, Step 3: Specify a domain for a pool, and Step 4: Add clients to a pool.

Step 3: Request data source owners to convert Bridge (legacy) schedules

After Bridge 2021.4 (or later) clients have been added to and running successfully in your network, ask data source owners to convert their Bridge (legacy) schedules to use Online schedules. For more information, see Migrate from Bridge (legacy) to Online schedules.

**Important:** We recommend that data source owners begin the process by converting refresh schedules for extract data sources that are least critical to daily business. This is because converting Bridge (legacy) to Online schedules will immediately delete the existing refresh schedules.

Step 4: Upgrade existing clients to Bridge 2021.4

Upgrade all existing clients to Bridge 2021.4 (or later). For more information, see Upgrade Bridge.

Step 5: Add existing clients to a pool

After upgrade, ensure upgraded clients are running as a Window service and then add those clients to the pool. For more information, see Step 4: Add clients to a pool.

(Archived) Deploying Bridge 2020.2-2021.3

The latest updates to Bridge include enterprise-specific improvements to provide better redundancy in refresh scenarios and help reduce the need for site admins to manage data sources. For more information about the changes, see What’s New in Tableau Online.
Step 1: Add new 2020.2-2021.3 clients first

The latest enterprise improvements have been designed to complement your existing Bridge deployment. Therefore, Tableau recommends that before you upgrade your existing clients, first add new 2020.2-2021.3 clients to your environment. For more information, see What’s New in Tableau Online.

Notes:

- New extract data sources that use the Online schedules will default to using 2020.2-2021.3 clients and new capabilities.
- Existing data sources that are already configured on a schedule (Bridge (legacy)) and associated with specific clients will continue to run as expected.
- New clients can refresh 10 data sources in parallel by default but can be configured to refresh up to 100 in the TabBridgeClientConfiguration.txt file. For more information, see Change the Bridge Client Settings.
- We recommend that no more than 10 clients run under the same Windows services account.

Step 2: Request data source owners to convert refresh schedules

After 2020.2-2021.3 clients have been added to and running successfully in your network, ask data source owners to convert their current refresh schedules (Bridge (legacy)) to use Online schedules. This applies to data sources that connect to relational data only. For more information, see Migrate from Bridge (legacy) to Online schedules.

Important:

- We recommend that data source owners begin the process by converting refresh schedules for extract data sources that are least critical to daily business. This is because converting existing refresh schedules (Bridge (legacy)) to Online schedules will immediately delete the existing refresh schedules.
- Schedules for extract data sources that connect to file data cannot be converted to
use integrated refresh schedules. Instead those data sources will continue to use the (Bridge (legacy)) schedule and the client that it’s linked to.

Step 3: Upgrade existing clients to Bridge 2020.2-2021.3

Upgrade all existing clients to Bridge 2020.2-2021.3. For more information, see Install Bridge.

Step 4: Add existing clients to a pool

After upgrade, ensure upgraded clients are running as a Window service and then add those clients to the pool. For more information, see Configure the Bridge Client Pool.

Connectivity with Bridge

When data sources or virtual connections connect to private network data that Tableau Online can't reach directly, Tableau Bridge is used to facilitate connectivity.

Supported connectivity

Bridge supports the connectivity scenarios described below.

Supported connectors

Bridge supports a combination of connectors that Tableau Desktop and Tableau Online supports, unless listed under Unsupported connectors below.

Supported connection types

Bridge supports both connections types, extract and live.

- Extract connection: When data sources or virtual connections use extracts, to connect to private network data, Bridge can be used to perform scheduled refreshes of those extracts. Refreshes can be scheduled, in most cases, by the content owner as part of the publishing process. For additional requirements to support extracts, see Additional requirements for extract connections.
• **Live connection**: Bridge supports data sources or virtual connections with live connections to private network data using a feature called live queries. If the content owner publishes a data source or virtual connection that uses a live connection to data that Tableau Online detects that it can't reach directly, live queries are automatically used to keep the content fresh. For additional requirements to support live queries, see Additional requirements for live connections.

**Supported data types**

The type of data that Bridge can support falls into one of the following categories:

• **Relational data**

• **File data**, including Excel, text, and statistical (.sas7bdat) files.

• **Private cloud data**, including Amazon Redshift, Teradata, and Snowflake. For more information, see Use Bridge for Private Cloud Data.

• **Some ODBC data**

• **Some web data connector (WDC) data** if the data can be accessed by entering a standard user name and password.

• **Data used in a multi-connection data source** (i.e., data sources that contain a cross-database join), when all connectors are supported by Bridge. For more information, see Refreshing Cross-Database Joined Data Sources on Tableau Bridge in the Tableau Knowledge Base.

**Limited connector support**

Similar to Tableau, Bridge provides limited support for data sources that use the connector plugins, Web Data Connector, or a JDBC or ODBC driver to connect to data. For more information about the support provided, see the following topics in the Tableau Help:

• **Web Data Connectors**

• **Other Databases (JDBC)**

• **Other Databases (ODBC)**
If a Tableau Datasource Customization (TDC) file is used to customize your generic JDBC or ODBC connections, you can use the steps described in Use .tdc files for generic JDBC or ODBC connections to ensure those customizations are used by Bridge as well.

About SAP HANA

If you want to connect to SAP HANA using live connections, parameters and variables must be disabled. Live connections to SAP HANA calculation views do not succeed with Bridge if parameters and variables are used.

Unsupported connectivity

There are a few connectivity scenarios that Bridge does not support. If any of these unsupported scenarios apply to you, consider When to use an alternative to Bridge below.

Unsupported connectors

- Google Analytics
- Google Sheets (deprecated)
- Google Drive
- Microsoft Analysis Services
- Microsoft PowerPivot
- Oracle Essbase
- SAP NetWeaver Business Warehouse
- Connectors (.taco) built with the Tableau Connector SDK and connectors available through Tableau Exchange

Unsupported connection types

- Live connections to file-based data
- Live connections to Google Cloud SQL, OData, Progress OpenEdge, and Tableau extracts
- All connections to cube-based data
- Snowflake when used with virtual connections
When to use an alternative to Bridge

Connecting to cloud data that Tableau Online can reach directly

For cloud data, setting up refresh schedules directly with Tableau Online is almost always a better (or in some cases the only) choice. For a list of connectors supported by Tableau Online, see Allow Direct Connections to Data Hosted on a Cloud Platform.

Refreshing extracts of other cloud data

For some cloud data, you can sign in to by providing a standard user name and password. For example, you might be able to connect to a MySQL database hosted on a cloud platform. In a scenario like this, you can set up a refresh schedule for extracts that connect to this type of data directly with Tableau Online. For more information, see Schedule Refreshes on Tableau Online.

Working with data accessed through OAuth

To refresh data when the connector is not supported by Bridge, as an alternative you can set up a schedule directly on Tableau Online, or for extracts of WDC data sources, you can refresh the extracts from Tableau Desktop either by using the Refresh from Source option, or by republishing the data source. For more information, see Refresh Published Extracts from Tableau Desktop.

Update Bridge Connection Information

This topic describes how a data source owner can update the connection information for a data source that connects to private network data.

Note: For information about connection information for virtual connections, see Create a Virtual Connection.

Embed or update database credentials

For live queries and scheduled refreshes to run as expected, data sources that require user authentication must have the database credentials embedded with the data source.
You can embed database credentials for your data source in one of two ways: 1) during publish time from Tableau Desktop or 2) after publishing from the data source’s Connection tab in Tableau Online. The procedure below describes how to embed database credentials on Tableau Online. For more information about embedding database credentials in Tableau Desktop, see Set Credentials for Accessing Your Published Data.

1. Sign in to Tableau Online and navigate to your data source.

2. From the data source page, click the Connections tab.

3. Select the check box next to the connection, click the Actions menu, and select Edit Connection.

4. In the Edit Connection dialog box, enter the database credentials required for accessing the data, and click Save.

Embed or update database credentials for Bridge (legacy)

If you use Bridge (legacy) schedules to refresh your data sources, you must embed the database credentials in the connection information in the Bridge client. This task must be done even if you embedded the database credentials at publishing time on Tableau Desktop.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. Point to the data source, and then click the Edit icon (✏️) that appears.

3. In the dialog box, enter the database credentials required for accessing the data, and
then click **Save**.

![Edit Database Credentials](image)

**Change the file path for a data source**

If **Bridge (legacy)** schedule is used to refresh, saved with the data source is the location of the file. In some cases, you might need to update the file location that the client references under the following circumstances:

- **Source file location has changed**

- **Data source was published from a mapped drive**: If a client used to perform refresh is running in Service mode and the data source was published from a mapped drive, the file path referenced by the client must be updated to use the full UNC path. The Windows services account that the client is running under must also have access to the UNC path location of the file. We strongly recommend clients running in Application mode also reference the UNC path for its file-based data sources.

When one of the above conditions is met, you can use the procedure below to change the file path for the data source.

1. Open the Windows system tray and click the Bridge icon to open the client.

2. Point to the data source, and then click the **Edit** icon (📝) that appears.
3. In the dialog box, enter the path location information and then click **Save**.

![Edit File Path dialog box]

Use .tdc files for generic JDBC or ODBC connections

You can use the steps described below to ensure customizations for generic JDBC or ODBC connections enabled through a Tableau Datasource Customization (TDC) file are also used by Bridge.

**Step 1: Customize the generic JDBC or ODBC connection**

If you aren’t already familiar with the type of customizations you can make to your JDBC and ODBC connections and how to create a TDC file, see [Customize and Tune a Connection](#) in the Tableau Help.

**Step 2: Save the TDC file in the My Tableau Bridge Repository**

In order for Bridge to use the customizations specified for generic ODBC or JDBC connections, you must save the TDC file in the location specified by the procedure below. To refresh JDBC or ODBC connections through Bridge pools, this step must be performed for all clients in the pool.

1. On the machine where the client is installed, go to the **Datasources** folder in the My Tableau Bridge Repository.

   The default location of the folder is `C:\Users\jsmith\Documents\My Tableau Bridge Repository\Datasources`. 
2. Place the TDC (.tdc) file into the **Datasources** folder.

3. Exit and restart the client for the changes to take effect. The way you restart the client depends on whether the client is running in Application or Service mode.
   - For Application mode - from the client menu, select **Exit**.
   - For Service mode - from the Mode drop-down menu, select **Application**; then from the client menu, select **Exit**.

4. Repeat steps 1-3 for all clients in the pool.

**Notes:**

- After you save the TDC file to the required location, customizations are applied to all generic JDBC or ODBC connections to the same underlying data.

- To validate the TDC file is being used, you can review the client log files (for example, C:\Users\jsmith\Documents\My Tableau Bridge Repository\Logs) for either of the following log entries:
  - Found matching TDC
  - Applying customization for genericjdbcd or Applying customization for genericodbc

**Change the connection type**

A data source can use one of two connection types: live or extract. The connection type determines the frequency at which the content can be updated to reflect the changes in the underlying data. Depending on the data that is being connected to, some data sources can have live or extract connections but other data sources can only have extract connections. For more information, see Connectivity with Bridge.

If you want to change the connection type of a data source, you must re-publish it from Tableau Desktop, and select the connection preference there. The publishing process will offer you the option to use live or extract depending on the private network data that the data source is connected to. If you switched from a live connection to extract, the workflow leads you through setting up a refresh schedule for your data source.
Repair connections

Occasionally something causes one or more of the connections to stop functioning normally. When this happens, an alert appears in the client, and it usually provides information that can direct you toward the cause of the problem. However, if the alert can’t provide any troubleshooting information and your client is running in Service mode, you can use the Repair option to try to reset the connections.

1. Open the Windows system tray and right-click the Bridge icon.

2. From the drop-down menu, select Repair. This option stops and restarts the service, which can be enough to resolve the issue.

Bridge Security

Tableau Bridge applies the following security designs:

- All communication is initiated from behind the private network firewall and therefore does not require you to manage additional exceptions.
- Data in transit, to and from Bridge, is encrypted.
- Database credentials are stored on the computer using Windows credentials manager if the data source or virtual connection is set up to use Bridge (legacy) schedules. For Online schedules, the credentials are passed on to the client that is selected to perform the refresh.

You can find more details about Bridge security in the sections below.

Transmission security

Data, to and from the Bridge client, is transmitted by a TLS 1.2 connection

Note: Tableau Bridge uses port 443 to make outbound internet requests to Tableau Online and port 80 for certificate validation.
Authentication

There are two primary authentication points for Bridge: Tableau Online and Private network data.

Tableau Online

To connect to Tableau Online, a users Tableau Online credentials are entered through the Bridge client.

After 1) the credentials are entered, 2) an authorization token is returned by Tableau Online. The 3) token is stored on the computer where the client is running using the credentials manager of the Windows operating system. Bridge uses the token to perform various tasks such as downloading the refresh schedule information for an extract.

Private network data

To access private network data, some data sources or virtual connections require authentication using database credentials. Depending on the connection type of the content, the client handles database credentials in one of the following ways:

- For **live connections and extract connections that use Online schedules**, database credentials are sent at the time of the request and use a TLS 1.2 connection.

- For **extract connections that use Bridge (legacy) schedules**, if the data source requires database credentials, these credentials must be entered in the client directly. The database credentials are stored on the computer using the credentials manager
Tableau Online Help

of the Windows operating system. The client sends the database credentials to the
database, which is also behind the private network firewall, at the scheduled refresh
time.

The client supports domain-based security (Active Directory) and user name/password cre-
dentials to access private network data.

Changes to private network firewall

The Bridge client requires no changes to the private network firewall. The client achieves this
by making only outbound connections to Tableau Online. To allow outbound connections,
the client uses the following protocols depending on the connection type used by the content:

- For live connections and extract connections that use Online schedules,
  secure WebSockets (wss://).

- For extract connections that use Bridge (legacy) schedules, HTTP Secure
  (https://).

Access to private network data

Connections to private network data are initiated by the Bridge client on behalf of Tableau
Online. The process by which the connection is initiated depends on the content type and
connection type.

- For data sources with live connections or virtual connections, the client 1)
  establishes a persistent connection to a Tableau Bridge service, which is the part of
  the client that resides on Tableau Online, using secure WebSockets (wss://). The cli-
  ent then waits for a response from Tableau Online before 2) initiating a live query to
  the private network data. The client 3) passes the query to the private network data,
  then 4) returns the private network data using 5) the same persistent connection.
For **data sources with extract connections that use Online schedules**, the client 1) establishes a persistent connection to a Tableau Bridge service, which is the part of the client that resides on Tableau Online, using secure WebSockets (wss://). The client then waits for a request from Tableau Online for new refresh schedules. When the client receives the requests, 2) the client contacts Tableau Online using a secure connection (https://) for the data source (.tds) files. 3/4) Then the client connects to the private network data using the embedded credentials that are included in the job request. The client 5) creates an extract of the data and then 6) republishes the extract to Tableau Online using the Tableau Bridge service. Steps 2-6 can be occurring in parallel to allow multiple refresh requests to happen.

For **data sources with extract connections that use Bridge (legacy) schedules**, the client 1) contacts Tableau Online using a secure connection (https://) for new refresh schedules and data source (.tds) files. If 2) this information is available, at the scheduled time, 3/4) the client connects to the private network data using the
stored credentials. The client 5) creates an extract of the data and then 6) republishes the extract to Tableau Online using a Tableau Bridge service. The Tableau Bridge service is a part of the client that resides on Tableau Online.

Additional security considerations

Optional forward proxy filtering

To ensure that your data is transmitted to Tableau Online only, you can implement domain-based filtering on outbound connections (forward proxy filtering) from the Bridge client.

The following list contains the partially qualified domain names that Bridge requires for outbound connections:

- *.online.tableau.com
- *.compute-1.amazonaws.com, Amazon VPC’s public DNS hostname, which takes the form ec2-<public-ipv4-address>.compute-1.amazonaws.com, for the us-east-1 region
- *.compute.amazonaws.com, Amazon VPC’s public DNS hostname, which takes the form ec2-<public-ipv4-address>.compute.amazonaws.com, for all other regions (outside of us-east-1)
- *.salesforce.com, optionally, if multi-factor authentication (MFA) with Tableau authentication (Tableau with MFA) is enabled for your site and your environment is using proxies that prevent clients from accessing other necessary services
- crash-artifacts-747369.s3.amazonaws.com, used for receiving crash dump reports
- s3-us-west-2-w.amazonaws.com, used for receiving crash dump reports
- s3-w-a.us-west-2.amazonaws.com, used for receiving crash dump reports
Refresh Published Extracts from Tableau Desktop

You can send updates to published extracts from Tableau Desktop. This option is best for refreshing extracts of data you maintain on your local network.

**Note:** If you want to refresh an extract, make note of the file format of the extract before you perform an extract refresh. If you perform a refresh on an .tde extract using version Current, the extract is upgraded to .hyper extract automatically. While there are many benefits of upgrading to a .hyper extract, you will be unable to open the extract with previous versions of Tableau Online. For more information, see Extract Upgrade to .hyper Format.

1. In Tableau Desktop, connect to the data source that is published to Tableau Online or open a workbook that connects to it.

   To connect to the server, use the address [https://online.tableau.com](https://online.tableau.com).

   In the Data pane, a data source published to a Tableau server shows a Tableau icon next to its name.

2. Select **Data > Tableau Data Server**, and then choose one of the following options:

   - **Refresh from Source**

     Refreshes the extract (full or incremental) using the data in the original data source.
This command is available only for extracts that include a connection to the original data source. If you connected directly to a extract file and then published it, the connection to the original data source is not included.

- **Append Data from Data Source**

  Updates the extract from another data source in the workbook.

- **Append Data from File**

  Updates the extract from the contents of a file if the original data source type of the extract is the same file-based data source or extract file.

**Note:** If you do not see the Tableau Data Server option, your data source may not be published to Tableau Online (in which case it will not show the icon above). If you see the Tableau Data Server option, but refresh commands are unavailable, the data source exists on the server, but it is not an extract. For example, it is a live connection to data hosted on the internet.

**See also**

Topics in the **Extracting Data** section in the Tableau Help.

**Automate Extract Refresh Tasks from the Command Line**

You can automate extract refresh tasks using the Tableau Data Extract Command-Line Utility. This is a command-line utility that comes with Tableau Desktop, through which you can refresh published extract data sources or append data to them from a file.

Requirements for using the Tableau Data Extract Command-Line Utility include the following:
- It is available with Tableau Desktop on Windows and can run only on a Windows system.

- It is not available with the trial version of Tableau Desktop.

- You can use it for extract data sources that don't use OAuth.

- You can use it to refresh single-connection data sources only. It does not work for multi-connection data sources.

**Important!** Tableau Data Extract command-line utility will be deprecated in September 2022 with the requirement of multi-factor authentication. To refresh data sources or virtual connections data that Tableau Cloud can't reach directly, use Tableau Bridge instead. For more information, see Set Up a Bridge Refresh Schedule.

To initiate refresh jobs using a script, use `tabcmd refreshextracts` or REST API Run Extract Refresh Task.

**Before you run the utility**

When an extract refresh or append data is performed on extracts created in Tableau 10.4 and earlier (that is, a .tde extract), the extract is upgraded to .hyper extract automatically. While there are many benefits of upgrading to a .hyper extract, you will be unable to open the extract with previous versions of Tableau Desktop.

For more information, see Extract Upgrade to .hyper Format.

**Run the utility**

1. Open the Command Prompt as an administrator and change to the Tableau Desktop bin directory. For example:

   ```
   cd C:\Program Files\Tableau\Tableau Current\bin
   ```

2. Use either of the following commands, adding parameters described in the tables
Tableau Online Help

below.

- tableau refreshextract
- tableau addfiletoextract

Note: When using the utility, always specify tableau on the command line or in scripts, never tableau.exe.

Note: To troubleshoot, check the logs in the tableaucom.txt file in the \My Tableau Repository\Logs folder.

Note: In a multiple-site environment, specify the site to which the command applies.

Syntax and parameters for the tableau refreshextract command

Use tableau refreshextract to refresh an extract on Tableau Server or Tableau Online. Refreshing an extract updates an existing extract with any modifications that have been made to the data source since the last refresh.

To see help for this command, at the Windows command prompt, type the following command:

```bash
tableau help refreshextract
```
Using parameters

- All options have a full form that you use with a double hyphen (for example, `--server`).
- Some options also have a short form that you use with a single hyphen (for example, `-s`).
- If the value for an option contains spaces, enclose it in quotation marks.
- The source being refreshed must be the original data source, not a .tde.

**Tableau refreshextract command options**

<table>
<thead>
<tr>
<th>Short Form</th>
<th>Full Form</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--source-username &lt;user name&gt;</code></td>
<td>A valid user name for the data source connection. Use this option with <code>--source-password</code>, or use <code>--original-file</code> instead of the user name and password options.</td>
<td></td>
</tr>
<tr>
<td><code>--source-password &quot;&lt;password&gt;&quot;</code></td>
<td>The password for the data source user.</td>
<td></td>
</tr>
<tr>
<td><code>--original-file &lt;path&gt;</code></td>
<td>Path and file name for the data source to be refreshed on the server. For example: <code>--ori-</code></td>
<td></td>
</tr>
</tbody>
</table>
To refresh a multi-file data source, pass the path to a folder that contains the data files. For example:

```
--original-file c:\folder\file.csv
```

If the file is on a network share, use the UNC format for the path:

```
\server\path\filename.csv
```

If the data source is set up for incremental refreshes, use this option to force a full extract refresh. If this option is not included, an incremental refresh is performed. Not all data sources support incremental refresh.

The URL for the Tableau server on which the data is published.

For Tableau Online, specify `https://online.tableau.com`.

In a multiple-site environment, specifies the site to which the command applies. For Tableau Online, use this argument if your user name is associated with more than one site. For Tableau Server, if you do not specify a site, the default site is assumed.

The site id is independent of the site name, and it is indicated in the URL when you view the site in a browser. For example, if the URL for the page you see after signing in to Tableau Online is

```
https://online.tableau.com/t/vernazza/views
```
the site id is *vernazza*.

`--datasource <datasource>`

The name of the data source, as published to Tableau Server or Tableau Online.

`--project <projectname>`

The project to which the data source belongs. If this option is not included, the default project is assumed.

If the project you want to specify is a child project nested within a project hierarchy, you must use this parameter along with the `--parent-project-path` parameter.

`--parent-project-path path/to/-project`

If a project to which the data source is published is not at the top level of a project hierarchy, use this parameter along with the `--project` parameter to specify the path to a nested project.

Use the forward slash character (/) to delimit project levels in the hierarchy. Use the backward slash (\), to escape instances of forward or backward slash characters in project names.

For example, for a project named Sandbox, in project Social, under top-level Marketing:

```
--project Sandbox --parent-project-path Marketing/Social
```

`-u <username>`

Valid Tableau Server or Tableau Online user.

`-p "<password>"`

The password for the specified Tableau Server or Tableau Online user.
Tableau Online Help

--proxy-user-name <username>
The user name for a proxy server.

--proxy-password "<password>" The password for a proxy server.

-c "<path and file name>" --config-file "<path and file name>"
Path and file name information for a file containing configuration options for the command. Always enclose the path in double quotation marks. For more information, see Using a config file below.

Sample tableau refreshextract command

The following command refreshes an extract named CurrentYrOverYrStats that has been published to Tableau Online. This command specifies the following:

- Tableau Online user and password.
- Tableau Online site and project names.
- The data source, which in this case is hosted by a cloud-based data source provider (for example, Salesforce.com), and the username and password to sign in to the hosted data source.

C:\Program Files\Tableau\Tableau Current\bin>tableau refreshextract --server https://online.tableau.com --user-name email@domain.com --password "OurServerPwd" --site ver-nazza --project "New Animations" --datasource "CurrentYrOverYrStats" --source-username database_user-@hosted_datasource_provider.com --source-password "db_pass-word"
To refresh an extract of file-based data source, provide the path to the original file from which you created the extract. If the file is on a network share, use the UNC format instead of a mapped drive.

C:\Program Files\Tableau\Tableau Current\bin>tableau
refreshextract --server https://online.tableau.com --user-name email@domain.com --password "OurServerPwd" --site nazza --project "New Animations" --datasource "CurrentYrOverYrStats" --original-file "\server\path\filename.csv"

Syntax for tableau addfiletoextract

Use `tableau addfiletoextract` to append file content to an extract that has been published to Tableau Server or Tableau Online. This command combines the two files.

If you want simply to update an existing extract with the latest changes, use the `refreshextract` command instead. Using `addfiletoextract` to update an existing extract will duplicate data instead.

To see help for this command, at the Windows command prompt, type the following command:

```
tableau help addfiletoextract
```

All options have a full form that you use with a double hyphen (for example, `--server`). Some options also have a short form that you use with a single hyphen (for example, `-s`). If the value for an option contains spaces, enclose it in quotation marks.

**tableau addfiletoextract command options**

<table>
<thead>
<tr>
<th>Short Form</th>
<th>Full Form</th>
<th>Description</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--file &lt;path and file name&gt;</code></td>
<td>Path and file name information for the data file containing data to append. The file can be from Excel, Access, a Tableau data extract, or a delimited text file. It cannot be password protected. Use UNC format if the file is on a network share. For example, <code>\server\path\filename.csv</code></td>
</tr>
<tr>
<td><code>-s &lt;server http address&gt;</code></td>
<td>The URL for the Tableau server on which the data is published. For Tableau Online, specify <code>https://on-line.tableau.com</code></td>
</tr>
<tr>
<td><code>-t &lt;site id&gt;</code></td>
<td>In a multiple-site environment, specifies the site to which the command applies. For Tableau Online, you must include this argument if your user name is associated with more than one site. For Tableau Server, if you do not specify a site, the default site is assumed.</td>
</tr>
<tr>
<td><code>--server &lt;URL&gt;</code></td>
<td></td>
</tr>
<tr>
<td><code>--site &lt;site id&gt;</code></td>
<td></td>
</tr>
<tr>
<td><code>--datasource &lt;datasource&gt;</code></td>
<td>The name of the data source, as published to Tableau Server or Tableau Online.</td>
</tr>
<tr>
<td><code>--project &lt;projectname&gt;</code></td>
<td>The project to which the data source belongs. If this option is not included, the default project is assumed. If the project you want to specify is a child project nested within a project hierarchy, you must use this parameter along with the <code>--parent-project-path</code> parameter.</td>
</tr>
</tbody>
</table>
If a project to which the data source is published is not at the top level of a project hierarchy, use this parameter along with the --project parameter to specify the path to a nested project.

Use the forward slash character (/) to delimit project levels in the hierarchy. Use the backward slash (\), to escape instances of forward or backward slash characters in project names.

For example, for a project named Sandbox, in project Social, under top-level Marketing:

```
--project Sandbox --parent-project-path Marketing/Social
```

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--parent-project-path path/to/project</td>
<td>If a project to which the data source is published is not at the top level of a project hierarchy, use this parameter along with the --project parameter to specify the path to a nested project. Use the forward slash character (/) to delimit project levels in the hierarchy. Use the backward slash (), to escape instances of forward or backward slash characters in project names. For example, for a project named Sandbox, in project Social, under top-level Marketing: --project Sandbox --parent-project-path Marketing/Social.</td>
</tr>
<tr>
<td>-u &lt;username&gt;</td>
<td>Valid Tableau Server or Tableau Online user.</td>
</tr>
<tr>
<td>-p &quot;&lt;password&gt;&quot;</td>
<td>The password for the specified Tableau Server or Tableau Online user.</td>
</tr>
<tr>
<td>--proxy-user-name &lt;username&gt;</td>
<td>The user name for a proxy server.</td>
</tr>
<tr>
<td>--proxy-password &quot;&lt;password&gt;&quot;</td>
<td>The password for a proxy server.</td>
</tr>
<tr>
<td>-c &quot;&lt;path and file-name&gt;&quot;</td>
<td>Path and file name information for a file containing configuration options for the command. Always enclose the path in double quotation marks. For more information, see Tableau Online Help.</td>
</tr>
</tbody>
</table>
Using a config file below.

Sample tableau addfiletoextract command

```
C:\Program Files\Tableau\Tableau Current\bin>tableau addfiletoextract --server https://online.tableau.com --username email@domain.com --password "OurServerPwd" --site vernazza --project "New Animations" --datasource "CurrentYrOverYrStats" --file "C:\Users\user2\Documents\DataUploadFiles\AprMay.csv"
```

Using a config file

You can use a plain text editor, such as Notepad or Text Edit, to create a config (configuration) file that you can use with `tableau refreshextract` or `tableau addfiletoextract`. A config file can be useful if you expect to update the same data source regularly over time. Instead of having to type the same options each time you run a command, you specify the config file. A config file also has the advantage of not exposing user names and passwords on the command line.

Create the config file

For example, say you created a file called `config.txt` and saved it to your Documents folder. And in the file, you included the parameter information shown below.

For an extract from a hosted data source, published to Tableau Online, where `server` is `https://online.tableau.com`:

```
server=https://online.tableau.com
site=vernazza
username=email@domain.com
password=OurPassword
project=New Animations
```
datasource=CurrentYrOverYrStats
source-username=database_user@hosted_datasource_provider.com
source-password=db_password

Reference the Config File from the Command Line

After you create the config file, you run the `tableau refreshextract` or `tableau addfiletoextract` command, pointing to the config file as the only option you use on the command line, and enclosing the config file’s path in double quotation marks. The syntax is as follows:

```bash
tableau refreshextract --config-file "<path>"
```

For example, to refresh the extract specified in the sample in the Create the config file section, you would run the following command (making sure that you are working in the bin directory for your version of Tableau Desktop):

```bash
C:\Program Files\Tableau\Tableau Current\bin>tableau refreshextract --config-file "C:\Users\user1\Documents\config.txt"
```

Syntax Differences for Config Files

The syntax for specifying options inside a config file differs from the syntax you use on the command line in the following ways:

- Option names do not begin with dashes or hyphens.
- You use an equals sign (with no spaces) to separate option names from option values.
- Quotation marks are not necessary (or allowed) around values, even when they include spaces (as for the `project` option in the example shown earlier).
Use Windows Task Scheduler to Refresh Extracts

You can use Windows Task Scheduler, in combination with the Tableau Data Extract Command-Line Utility, to automate regular updates to Tableau Online data sources from within your corporate firewall. You can configure a task to occur once per day, week, or month, or after a specific system event. For example, run the task when the computer starts.

To learn more, see the Task Scheduler How To... page in the Microsoft TechNet library.

Set Up for Data-Driven Alerts

When data reaches important thresholds for your business, data-driven alerts automatically send email notifications to key people users specify. As a Tableau Online administrator, you set up data-driven alerts much like you do subscriptions. For information about how users create and manage these alerts, see Send Data-Driven Alerts in Tableau User Help.

Manage all data-driven alerts in a site

1. At the top the browser window, click Tasks, and then click Alerts.

2. Select any alerts you want to update.

3. From the Actions menu, do any of the following:

   - Add or remove yourself as a recipient.
   - Edit alerts to change data thresholds, delivery schedules, and the full list of recipients.
   - Change alert ownership to different users, or delete alerts.

Disable data-driven alerts for a site

Data-driven alerts are supported for all sites by default, but administrators can disable them for specific ones.
1. While viewing a site, click **Settings** on the left side navigation pane.

2. Under Data-Driven Alerts, uncheck **Let users create alerts and receive alert emails**.

3. Click **Save**.

**Suspend data-driven alerts**

**Resume suspended alerts**

If an alert fails enough times, you'll receive a notification email that your alert has been suspended. There are a few ways that administrators or alert owners can resume a suspended alert:

- From the Tasks > Alerts area of Tableau web pages, an icon appears in the Last checked column to indicate that the alert is suspended. Select ... > **Resume Alert** to resume the alert.

- Click **Resume Alert** in the notification email to resume the alert. A notification will either allow you to resume the alert, or indicate that the view has changed and the alert should be deleted.

- From the Alerts panel of the affected view or workbook. To resume the alert from a view or workbook, select **Alert** to open the Alerts panel. An icon appears next to the suspended alert. Select **Actions > Resume Alert** on the affected alert to resume.

Alert owners will receive an email notification when the alert is working again.

**Identify and fix failing alerts**

As an administrator, you can proactively identify failing alerts that users may be unaware of.

To check:
1. Select Status in your site menu

2. Select Background tasks for non-extracts

3. From the Task drop-down menu, select Check if Data Alert is True

4. In the far right, click on Error to see a list of failing alerts

5. Hover over the red failure icon to display a tooltip with alert details

To determine the alert owner, look for the alert ID number in the data_alerts table of the Tableau Online Repository. (In the alert management area of a site, you can also look for the alert name following the number, but be aware that multiple different alerts may use the same name.)

**Note:** Alert owners will be automatically notified when an alert fails ten times. Administrators can customize when alert owners receive notifications.
Failing alerts are often caused by content changes on Tableau Online. Encourage users to recreate alerts if changes like the following occur:

- A workbook, view, or data field is removed or renamed.
- Database credentials embedded in workbooks expire. (Alerts require workbooks to use either embedded credentials, or none at all.)
- A data source becomes inaccessible.

**Set Up for Metrics**

Metrics are a type of Tableau content that tracks the value of an aggregate measure, such as sum of sales. Because metrics refresh frequently and display their current value in an easy-to-glance format, they are useful for monitoring data. To learn more about how users work with metrics, see Create and Troubleshoot Metrics.
Ensure that users can create metrics

When metrics are enabled for a site, all users with a Creator or Explorer (can publish) site role can create metrics, if they have the correct permissions.

Metrics are created from existing views on a Tableau site. To ensure that users can create metrics on a view, verify that:

- Users have the Create/Refresh Metrics permission capability for the workbook that the view belongs to. For more information, see Permissions.
- The password for the data source is embedded, if it is required. For more information, see Edit Connections on Tableau Online.

Disable metrics for a site

Metrics are enabled on all sites by default. You can disable metrics on a per-site basis.

1. On the site where you want to disable metrics, from the navigation panel, click Settings.
2. Under Metrics Content Type, uncheck Enable metrics.
3. Click Save.

When you disable the metrics content type, metrics no longer appear on the site. The data for any existing metrics is retained, but these metrics will no longer refresh. If you re-enable metrics, these metrics will reappear and resume refreshing.

You can also disable metrics on a specific workbook by denying the Create/Refresh Metrics permission capability. For more information, see Permissions.

Manage metrics

Though metrics are created from a view, they are not tied to the view like alerts or subscriptions. This means you can manage metrics similar to how you manage workbooks, by renaming, moving, tagging, deleting, or setting permissions on a metric.

Find metrics to manage either by navigating the project hierarchy or via the following paths.
To see all metrics on a site: Navigate to the Explore section, then select All Metrics.
To see metrics created from all the views in a workbook: Navigate to the workbook, then select the Connected Metrics tab.
To see metrics created from a single view: Open the view, then select Watch > Metrics from the toolbar.

Address failing and suspended metric refreshes

Metric refreshes may fail for one of the following reasons.

- The connected view was deleted or modified.
- Permissions changed for the connected view.
- The password for the data source is no longer embedded or is no longer valid.
- The metric owner doesn’t have the required site role to refresh the metric. A site role of Creator or Explorer (can publish) is required.
- There was a temporary connectivity issue, which will resolve itself.

**Note:** If the metric refresh is suspended because the owner doesn’t have the required site role for it to refresh, you won’t be able to resume the refresh unless you change the owner.

For more information on why metric refreshes fail and what users can do to fix them, see Fix failing refreshes.

Encourage users to overwrite a metric if the connected view was modified in a way that caused the refresh to fail, but the view is still available. Users can overwrite a metric by creating a metric with the same name in the same project as the existing metric.

Resume suspended refreshes

If the cause of the failure is fixed, for example by embedding the correct password for the data source, you can resume the metric refresh.

1. Locate the affected metric. Metrics with suspended refreshes display the text Refresh Suspended, instead of the time of last refresh, in grid and list view.
2. On the warning message, click Resume refresh.
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Tableau attempts to perform the refresh. If this attempt succeeds, you’ll receive a confirmation, and the refresh will resume on schedule. If the attempt doesn’t succeed, the refresh remains suspended. You or the metric owner can delete or overwrite the metric, or keep it to reference historical data.

Monitor metric activity with administrative views

Use the administrative views for Tableau Online to monitor metric activity.

To monitor metric refresh activity:

1. From the navigation panel, click Site Status.
2. Select the Background Tasks for Non Extracts dashboard.
3. Filter for the tasks Find Metrics to Update or Update All Metrics on a View. For more information, see Background Tasks for Non Extracts.

To monitor more metric events, create a custom view using Admin Insights. Connect to the Admin Insights TS Events data source and use the Event Name dimension to see the following events: Create Metric, Delete Metric, Move Metric From, Move Metric To, and Update Metric. For more information, see Use Admin Insights to Create Custom Views.

Troubleshoot Refresh Issues

When Tableau Online is unable to complete a scheduled refresh, an alert appears to indicate that the refresh has failed. If a scheduled refresh fails five consecutive times, Tableau Online suspends the refresh. When a refresh is suspended, Tableau Online does not try to run it again until you take an action that attempts to correct the cause of the failure.

To display an alert that describes the reason the refresh failed, select the notification icon ( annunciator) in the upper-right corner of the browser window.

Resolve errors and resume suspended refreshes

To help 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

To correct these issues, click the **Connection Details** link in the alert to go to the **Connection** tab on the data source page for the data source whose scheduled failed. On the Connections tab, select the check box next to the data connection, and click **Edit Connection** so you can update a user name or password, or select a different access token. After you update the connection information, Tableau Online 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. Otherwise, Tableau Online restarts the existing schedule.

• Errors that indicate the database was unreachable

Confirm that the underlying database is online and that you can sign in to access its data. You can use the **Try again** link in the alert to restart the refresh schedule.

• Errors related to Tableau Bridge

To troubleshoot errors related to Bridge, see Troubleshoot Issues with Bridge.
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.

Can't see images in email

For images of content to display in a subscription email, users subscribed to views, in addition to View permissions, must also have Download Image/PDF permissions. For more information, see Permissions.

Can't subscribe

If you can see a view on Tableau Server and it has a subscription icon (签证) in the upper right corner, you can subscribe to it.

To subscribe to a view, 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 publish time. Embedding credentials is a step that happens in Tableau Desktop (see the Tableau Help for details).
No subscription icon

It's possible to see a view but be unable to subscribe to it. This can happen:

- **The view uses a live database connection**: Views with live database connections, where you're prompted for your database credentials when you first click the view, aren't available for subscription. A subscription includes a view (or workbook), data, and a schedule. To deliver the data required for the view, 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.

Missing PDF attachment

You can add a PDF attachment to your subscription if your administrator has it enabled. If the PDF attachment is missing from your subscription, it might be because the size of the PDF exceeds the email size limit. In Tableau Online, each site has a maximum email size of 2MB. For details, see Tableau Online Site Capacity.

Suspended Subscriptions

By default, a subscription is suspended after 5 consecutive subscription failures.

Resume suspended subscriptions

Subscription owners can resume subscriptions:

- from My Subscription tab in Content Settings
- from the Subscriptions tab per workbook

When a subscription is resumed, the alert failing count goes back to zero. The next evaluation of the subscription will occur at the next scheduled evaluation time.
Can't set subscription frequency to "When Data Refreshes"

You can set subscriptions to run when an extract refreshes if the workbook uses a connection to a published extract. When creating or modifying a subscription, you might not see a **Frequency** option if the workbook uses:

- An extract refresh through Tableau Bridge
- More than one extract refresh
- A live data connection

**Note**: If a workbook's data source contains multiple connections where one connection is to a published extract and the other connection requires Tableau Bridge, you might be able to set the subscription frequency to **When Data Refreshes**. If selected, the subscription will run on the extract refresh, not the Tableau Bridge refresh.

**Missing data quality warnings**

Data quality warnings are included in subscription emails when:

- Tableau Server or Tableau Online is licensed with Data Management. For more information, see About Data Management.
- Tableau Catalog is enabled. For more information, see Enable Tableau Catalog.
- In site settings, the checkbox under Data Quality Warnings in Subscriptions is selected.

**Manage Connection Information**

**Edit Connections on Tableau Online**

Administrators and data source owners can manage a published data source's connection information. The connection information describes the data source, its owner, and how to access the data. You can embed database credentials in the connection to allow users to access the data directly or to enable scheduled refreshes for extracts. Alternatively, you can
set the connection so that users are prompted to sign in. You can also change the server name for cloud-based data.

The data source owner or a site administrator can manage this information directly on the site. For example, you can update tags or change the data source owner, without having to republish the data source.

1. On the site that has the data source you want to modify, open the Explore page, then filter to show All Data Sources.

If there are a large number of data sources, use filters to narrow the list.
2. Select the check box next to the data source you want to update, and on the Actions menu, select Edit Connection.

   **Note:** The Edit Connection option is not available for connections to extracts and file-based data.

3. Update the connection information and click Save.

   For connections that support using saved credentials to refresh the data, see Refresh Data Using Saved Credentials.

4. Refresh the Data Connections page (press F5 or Ctrl+R) for your changes to take effect.

**OAuth Connections**

An alternative to storing your sensitive database credentials with Tableau Online is to create connections using the **OAuth 2.0** standard. The following connectors support OAuth
authentication:

- Anaplan
- Azure Data Lake Storage Gen2, Azure SQL, Azure Synapse
- Box
- Esri ArcGIS Server
- Databricks
- Dremio
- Dropbox
- Google Ads, Google Analytics, Google BigQuery, Google Sheets (deprecated in March 2022)
- LinkedIn Sales Navigator
- Marketo
- OneDrive
- Oracle Eloqua
- QuickBooks Online
- Salesforce, Salesforce CDP
- ServiceNow ITSM
- Snowflake

From Tableau, when users sign in to data with a connector that uses OAuth, users are redirected to the authentication provider’s sign-in page. After user provide their credentials and authorize Tableau to access their data, the authentication provider sends Tableau an **access token** that uniquely identifies Tableau and the users. This access token is used to access data on users' behalf. For more information, see Overview of the OAuth process below.

Using OAuth-based connections provides the following benefits:

- **Security**: Your database credentials are never known to or stored in Tableau Online, and the access token can be used only by Tableau on behalf of users.

- **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.
Overview of the OAuth process

The following steps describe a workflow in the Tableau environment that calls the OAuth process.

1. A user takes an action that requires access to a cloud-based data source.

   For example, you open a workbook that’s published to Tableau Online.

2. Tableau directs the user 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 the user signs in to the data, the provider prompts the user to confirm their authorization for Tableau Online to access the data.

4. Upon the user’s confirmation, the data provider sends an access token back to Tableau Online.

5. Tableau Online presents the workbook and data to the user.

The following user workflows can use the OAuth process:

- Creating a workbook and connecting to the data source from Tableau Desktop or from Tableau Online.

- Publishing a data source from Tableau Desktop.
• Signing in to a Tableau Online site from an approved client, such as Tableau Mobile or Tableau Desktop.

**Note:** Tableau Bridge supports OAuth for the authentication of connectors: Snowflake, Google BigQuery, Google Drive, Salesforce, and OneDrive.

Default saved credential connectors

_Saved credentials_ refers to the functionality where Tableau Online stores user tokens for OAuth connections. This allows users to save their OAuth credentials to their user profile on Tableau Online. After they have saved the credentials, they will not be prompted when they subsequently publish, edit, or refresh when accessing the connector.

All supported connectors are listed under **Saved Credentials for Data Sources** on users’ **My Account Settings** page on Tableau Online. Users manage their saved credentials for each connector.

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 Online 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 Online sites allows 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 Access Sites from Connected Clients.
Default managed keychain connectors

*Managed keychain* refers to the functionality where OAuth tokens are generated for Tableau Online by the provider and shared by all users in the same site. When a user first publishes a data source, Tableau Server prompts the user for the data source credentials. Tableau Online submits the credentials to the data source provider which returns OAuth tokens for Tableau Online to use on behalf of the user. On subsequent publishing operations, the OAuth token stored by Tableau Online for the same class and user name is used so that the user is not prompted for the OAuth credentials. Should the data source password change, then the above process is repeated and the old token is replaced by a new token on Tableau Online.

Additional OAuth configuration on Tableau Online isn’t required for the default managed keychain connectors:

- Google Analytics, Google BigQuery, and Google Sheets (deprecated in March 2022)
- Salesforce

Configure custom OAuth

Beginning with 2021.2, as a site admin, you can configure a custom OAuth client, for each OAuth supported data provider (connector), to override the pre-configured OAuth client settings for your site. You might consider configuring a custom OAuth client to support securely connecting to data that requires unique OAuth clients.

When a custom OAuth client is configured, default configurations are ignored and all new OAuth credentials created on the site use the custom OAuth client by default.

**Important:** Existing OAuth credentials established before the custom OAuth client is configured are temporarily usable but both site admins and users must update saved credentials to help ensure uninterrupted data access.
Step 1: Prepare the OAuth client ID, client secret, and redirect URL

Before you can configure the custom OAuth client, you need to collect the information listed below. After you have this information, you can configure the custom OAuth client for each of the OAuth supported connector.

- **OAuth client ID and client secret**: First register the OAuth client with the data provider (connector) to retrieve the client ID and client secret generated for Tableau Online. Supported connectors include:
  - Azure Data Lake Storage Gen2, Azure SQL Database, Azure Synapse
  - Databricks
  - Dremio
  - Dropbox
  - Google Analytics, Google BigQuery, Google Sheets (deprecated in March 2022)
  - Intuit Quickbooks Online
  - Salesforce, Salesforce CDP

- **Redirect URL**: Note the pod your Tableau Online site is located to ensure you enter the correct redirect URL during the registration process in **Step 2** below. The redirect URL uses the following format:

  https://<your_pod>.online.tableau.com/auth/add_oauth_token

  For example, https://us-west-2b.online.tableau.com/auth/add_oauth_token

  **Note:** For more information about pods, see the Tableau Trust page.

Step 2: Register OAuth client ID and client secret

Follow the procedure described below to register the custom OAuth client to your site.

1. Sign in to Tableau Online using your site admin credentials and navigate to the Settings page.
2. Under OAuth Clients Registry, click the **Add OAuth Client** button.

3. Enter the required information, including the information from **Step 1** above:
   a. For **Connection Type**, select a database class value that corresponds to the connector whose custom OAuth client you want to configure.
   b. For **Client ID, Client Secret**, and **Redirect URL**, enter the information you prepared in **Step 1** above.
   c. Click the **Add OAuth Client** button to complete the registration process.

4. (Optional) Repeat step 3 for additional connectors.

5. Click the **Save** button at the bottom or top of the Settings page to save changes.

**Step 3: Validate and update saved credentials**

To help ensure uninterrupted data access, you (and your site users) must delete the previous saved credentials and add it again to use the custom OAuth client instead of the default OAuth client.
1. Navigate to your My Account Settings page.

2. Under Saved Credentials for Data Sources, do the following:
   1. Click Delete next to the existing saved credentials for the connector whose custom OAuth client you configured in Step 2 above.
   2. Next to the same connector, click Add and follow the prompts to 1) connect to the custom OAuth client configured in Step 2 above and 2) save the latest credentials.

Step 4: Notify users to update their saved credentials

Make sure you notify your site users to update their saved credentials for the data provider whose custom OAuth client you configured in Step 2 above. Site users can use the procedure described in Update saved credentials to update their saved credentials.

Set Up OAuth for Salesforce CDP

Beginning in January 2022, Tableau Online supports connecting to and refreshing Salesforce CDP data using the OAuth standard.

To enable OAuth connections to Salesforce CDP data from Tableau Online there are a few necessary configuration steps that need to be performed in your Salesforce CDP account and in your Tableau Online site.

Requirements

Enabling OAuth for Salesforce CDP requires both a Salesforce CDP admin and Tableau Online site admin.

Summary of steps

Setting up OAuth for Salesforce CDP consists of the following tasks:

1. Configure Salesforce CDP APIs to allow queries to Salesforce CDP data (egress of data).
2. Create a Salesforce connected app to handle OAuth delegation from Tableau Online.
Tableau Online Help

Step 1: Configure Salesforce CDP APIs

As a Salesforce CDP admin, use the procedure described below to configure the Salesforce CDP APIs to enable queries to Salesforce CDP data (egress of data). The procedure will describe how to create two custom Salesforce CDP API scopes, cdpquery and cdp-profile.

1. Log in to Salesforce CDP using the Admin user role for your organization and do the following:

   a. Go to Setup, and search for and select OAuth Custom Scopes.

   b. Create two custom scopes named cdpquery and cdp-profile.

2. Sign in to Tableau Online as a site admin and do the following:

   a. From the browser’s address bar, copy the first part of your Tableau Online URL, including the https protocol (for example, https://us-west-2b.online.tableau.com)

   b. Replace <tableau_url> in the following authorization URL with the first part of your Tableau Online that you copied in step a:

      https://-
      login.-
      salesforce.com/services/oauth2/authorize?response_type=token&client_id=3MVG9VeA0y5y3BQVJqaUbFmV5jfrJwz6_K.i8UWdbF3ZXMXdS_59Dz9rxW8Qt-gNzu3.Otq8yKxqlYJ9yBardP&redirect_uri-
      i=https://<tableau_url>/auth/add_oauth_token

      For example:

      https://-
      login.-
      salesforce.com/services/oauth2/authorize?response_type=token&client_id=3MVG9VeA0y5y3BQVJqaUbFmV5jfrJwz6_K.i8UWdbF3ZXMXdS_59Dz9rxW8Qt-gNzu3.Otq8yKxqlYJ9yBardP&redirect_uri-i=https://us-west-2b.online.tableau.com/auth/add_oauth_token
c. Copy your version of the authorization URL and paste it in a web browser.

d. Click **Allow** when prompted.

Step 2: Create a Salesforce connected app

After creating the Salesforce CDP API scopes, as the Salesforce CDP admin, use the procedure below to create a Salesforce connected app to handle OAuth delegation from Tableau Online.

**Note:** The following procedure documents the process in Salesforce Lightning. If you are using the traditional Salesforce interface, the navigation might be different but the configuration is the same.

1. Back in your Salesforce CDP account, go to Setup, and then search for and select **Connected Apps OAuth usage**.

2. Click the **Install** button next to Salesforce CDP Tableau Prod Connection.
3. When prompted, click **Install** to confirm.

4. Click **Manage App Policies** next to Salesforce CDP Tableau Prod Connection.

5. Scroll down to OAuth Custom Scopes and click the **Manage OAuth Custom Scopes**

6. Select **cdpprofile** and **cdpquery** check boxes, and then click **Save**.

When configured, all new Salesforce CDP connections from a Tableau Online site use the Salesforce CDP connected app by default.

**Manage Saved Credentials for Data Connections**

Saved credentials enable you to connect to a data source without being prompted for your credentials. The credentials saved for your connection can be OAuth access tokens, or other credentials, such as user name and password.

On Tableau Online, you can manage saved credentials on your Account Settings page.
Note: If you do not see the Saved Credentials section, consult with your site admin about allowing saving credentials.

Remove saved credentials

To remove Tableau access to data, delete the associated saved credentials for that data 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 new saved credentials.

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 saved credential is associated with the data connection for all users, and it does not appear under Saved Credentials on your Account Settings page.

Note: If you’re a Tableau Server user and can’t delete saved credentials, ask your administrator if they’ve cleared the Allow users to save data source access tokens option in the server settings.

Test connections using saved credentials

If the connector supports test functionality, you can test the connection using saved credentials.

1. While you’re signed in to Tableau Server or Tableau Online, display your Account Settings page.

2. In the Saved Credentials section, click the Test link next to the stored connection that you want to test.

This test confirms that Tableau Online or Tableau Server can access your account using this corresponding saved credential. If the 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.

Update saved credentials

To help ensure uninterrupted data access from existing Tableau content after a custom OAuth client has been configured for your site, we encourage you to update your saved credentials. To update saved credentials, you can delete the previous saved credentials for a particular connector and then add it again.

When you add saved credentials again, both new and existing Tableau content will access the data using the custom OAuth client configured by your site admin. For more information about custom OAuth clients, see OAuth Connections.

1. Sign in to Tableau Server and navigate to your My Account Settings page.

2. Under Saved Credentials for Data Sources, do the following:

   1. Click Delete next to the saved credentials for a connector.

   2. Next to the same connector, click Add and follow the prompts to 1) connect to the custom OAuth client that your site admin notified you about and 2) save the latest credentials.

Clear all saved credentials

When you select Clear All Saved Credentials, the following items are removed from your user account:
• All saved credentials for connections that are stored in your account.

**Caution:** If any of these saved credentials 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 saved credentials are used.

• Passwords you have used to access published data extracts or workbooks that connect to them.

Create and Interact with Flows on the Web

Starting in version 2020.4, you can create and interact with flows on Tableau Online to clean and prepare your data. Connect to your data, build a new flow, or edit an existing flow and your work is automatically saved every few seconds as you go. Create draft flows that are only available to you or publish your flow to make it available for others. Run your individual flows right from the web or run your flows automatically on a schedule using Tableau Prep Conductor if Data Management is licensed. For more information, see Tableau Prep on the Web.

Turn flow web authoring on or off for a site

**Note:** This setting is only available for Tableau Server. Web authoring is enabled for Tableau Online and cannot be turned off.

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. In the **Web Authoring** section, select **Flows. Let users edit flows in their browser.** to enable the functionality.
Clear the check box to turn off web authoring for that site.

3. If 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.

Enable linked tasks

*Supported in Tableau Online and Tableau Server version 2021.3 and later.*

Use the **Linked Tasks** option to schedule up to 20 flows to run sequentially, one after the other. Linked tasks can only be run on schedules with the **Linked Tasks** option selected. For more information about setting up linked tasks, see Schedule linked tasks.

Starting in version 2022.1, **Linked Tasks** is enabled by default on the **Server Settings** and for any new flow schedules that you create. In prior versions, administrators must first enable the option.

If you have multiple sites, you can turn off **Linked Tasks** for individual sites by clearing the check boxes described below.

If the setting is turned off after linked tasks are scheduled, any tasks that are running will complete and the scheduled linked tasks are hidden and no longer show on the **Scheduled Tasks** tab.

**Enable Linked Tasks** (version 2021.4 and earlier)

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable **Linked Tasks** for flows. In that site, click **Settings**.

2. In the **Linked Tasks** section, select **Let users schedule linked tasks** to enable
administrators to configure schedules to run linked tasks.

3. Select **Let users run linked tasks manually using Run Now** to enable users to run linked flow tasks using **Run Now**.

   ![Linked Tasks](Image)

   **Linked Tasks**
   
   This setting allows users to schedule tasks to run one after the other. Learn more
   
   - Let users schedule linked tasks
   - Let users run linked tasks manually using Run Now

---

### Enable flow parameters

Enable users to schedule and run flows that include parameters. Parameters enable users to scale their flows by building them once, then changing the parameter values to accommodate different data scenarios.

Parameters can be entered in an input step for file name and path, table name, or when using custom SQL queries, in an output step for file name and path and table name, and in any step type for filters or calculated values.

Flow parameter settings can be applied at the server level to include all sites on Tableau Server. The settings can be disabled at the site level to include only specific sites.

For more information about using parameters in flows, see **Create and Use Parameters in Flows** in the Tableau Prep help.

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable **Flow Parameters**. In that site, click **Settings**.

2. In the **Flow Parameters** section, select **Let users run and schedule flows that use parameters** to enable the functionality.

3. Select **Allow parameters that can accept any input** to enable anyone running the flow to enter any parameter value in the flow at run time.
Tableau Online Help

**Important:** Setting this option enables any flow user to enter any value in a parameter, potentially exposing data that the user should not have access to.

If this option is not selected, users can only select from predefined list of parameter values and any flows that include parameters that accept any value cannot be run or scheduled to run.

<table>
<thead>
<tr>
<th>Flow Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>This setting allows flows that include parameters to be scheduled and run on the site, and enables anyone running the flow to set flow parameters at run time or when scheduling a task. Learn more</td>
</tr>
<tr>
<td>☑ Let users run and schedule flows that use parameters</td>
</tr>
<tr>
<td>☑ Allow parameters that can accept any input. This can impact security. Learn more</td>
</tr>
</tbody>
</table>

**Enable Tableau Prep Conductor**

If Data Management is licensed, enable this option to let users schedule and track flows in Tableau Server and Tableau Online. For information about the additional configuration requirements for Tableau Prep Conductor, see [Tableau Prep Conductor](#).

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable Tableau Prep Conductor. In that site, click **Settings**.

2. In the **Tableau Prep Conductor** section, select **Let users schedule and monitor flows** to enable the functionality.

<table>
<thead>
<tr>
<th>Tableau Prep Conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users with appropriate permissions can schedule and monitor flows.</td>
</tr>
<tr>
<td>☑ Let users schedule and monitor flows</td>
</tr>
</tbody>
</table>
Enable Run Now

Control whether users or only administrators can run flows manually using the Run Now option. Data Management is not required to run flows manually.

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable Run Now for flows. In that site, click Settings.

2. In the Run Now section, select Let users run jobs manually using Run Now to enable the functionality.

Clear the check box if only Server Administrators can run flows manually.

Flow Subscriptions

Control whether users can receive flows notifications about scheduled tasks for successful flow runs. Data Management is required to enable notifications.

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable flow subscriptions. In that site, click Settings.

2. In the Flow Subscriptions section, select Let users send or receive emails that include flow output data to enable the functionality.
Flow Subscriptions

Flow owners can schedule and send emails with flow output data to themselves and others. Learn more

- Let users send or receive emails that include flow output data
- Attach .csv and .xlsx flow output files. This option sends data outside of Tableau and is not recommended

Note: The option to attach either a .csv or .xlsx file type to the email is only available for on-premise environments.

Enable Tableau Prep Extensions

Supported in Tableau Server and Tableau Online starting in version 2021.2.0

Set this option to control whether users can connect to Einstein Discovery to run predictive models against data in their flow.

You can use Einstein Discovery-powered models to bulk score predictions for the data in your flow when authoring flows on the web. Predictions can help you make better informed decisions and take actions to improve your business outcomes.

You’ll need to configure additional settings to include predictions in our flow. For more information, see Add Einstein Discovery Predictions to your flow and Configure Einstein Discovery Integration.

1. In a web browser, sign in to the server as an administrator and go to the site in which you want to enable Tableau Prep Extensions. In that site, click Settings > Extensions.

2. In the Tableau Prep Extensions section, select Let users connect to Einstein
Discovery to enable the functionality.

**Tableau Prep Extensions**

Enable access to Einstein Discovery so that users can run predictive models against data in their flow. Learn more

- Let users connect to Einstein Discovery

**Turn autosave off or on**

Enabled by default, this feature automatically saves a user's flow work every few seconds.

While not recommended, administrators can disable autosave on a site using the Tableau Server REST API method "Update Site" and `flowAutoSaveEnabled` setting. For more information, see Tableau Server REST API Site Methods: Update Site. For more information about autosave on the web, see Turn autosave off or on.

For more information about configuring site settings, see Site Settings Reference in the Tableau Server help.

**Tableau Prep on the Web**

*Internet Explorer 11 on Windows and compatibility mode for Internet Explorer is not supported.*

Starting in version 2020.4, Tableau Prep supports web authoring for flows. Now you can create flows to clean and prepare your data using Tableau Prep Builder, Tableau Server, or Tableau Online. You can also manually run flows on the web and the Data Management is not required.

While most of the same Tableau Prep Builder functionality is also supported on the web, there are a few differences when creating and working with your flows.

**Important:** To create and edit flows on the web you must have a Creator license. Data Management is only required if you want to run your flows on a schedule using Tableau Prep
Tableau Online Help

Conductor. For more information about configuring and using Tableau Prep Conductor, see Tableau Prep Conductor in the Tableau Server or Tableau Online help.

Installation and Deployment

To enable users to create and edit flows on the web, you’ll need to configure several settings on your server. For more information about each of these settings, see Create and Interact with Flows on the Web.

- **Web Authoring**: Controls whether users can create and edit flows on Tableau Server or Tableau Online.
- **Run Now**: Controls whether users or only administrators can run flows manually using the Run Now option. The Data Management isn’t required to run flows manually on the web.
- **Tableau Prep Conductor**: If Data Management is licensed, enable this option to let users schedule and track flows.
- **Tableau Prep Extensions** (version 2021.2.0 and later): Controls whether users can connect to Einstein Discovery to apply and run predictive models against data in their flow.
- **Autosave**: Enabled by default, this feature automatically saves a user’s flow work every few seconds.

Sample data and processing limits

To maintain performance while working with flows on the web, limits are applied to the amount of data you can include in a flow.

The following limits apply:

- When connecting to files, the maximum file size is 1GB.
- The data sampling option to include all data is not available. The default sample data limit is 1 million rows.
- The maximum number of rows that a user can select when using large data sets is configured by the administrator. As a user, you can select the number of rows up to that limit.
- In Tableau Online, the number of flow runs you can perform in a day is limited by the site administrator. For more information, see Tableau Online Site Capacity.
Available features on the web

When you create and edit flows on the web you may notice a few differences in navigation and the availability of certain features. While most features are available across all platforms, some features are limited or not yet supported in Tableau Server or Tableau Online. The following table identifies features where differences might apply.

<table>
<thead>
<tr>
<th>Feature area</th>
<th>Tableau Prep Builder</th>
<th>Tableau Server</th>
<th>Tableau Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect to Data*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Build and Organize your Flow</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Set your data sample size**</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Union files and database tables in the input step***</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clean and Shape Data</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Copy data grid values</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Aggregate, Join, or Union Data</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Use R and Python Scripts in your Flow****</td>
<td>✓</td>
<td>✓</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Create reusable flow steps</td>
<td>✓</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Automatically save your flows on the web</td>
<td>Not Applicable</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic file recovery</td>
<td>✓</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>View flow output in Tableau Desktop</td>
<td>✓</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
Tableau Online Help

<table>
<thead>
<tr>
<th>Action</th>
<th>Web</th>
<th>Team</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an extract to a file</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Create an extract to a Microsoft Excel worksheet</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Connect to a Custom SQL Query</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Create a published data source</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Save flow output to external databases</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Add Einstein Discovery Predictions to your Flow</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

* Some connectors may not be supported on the web. Open the Connect pane on your server to see supported connectors.

** In Tableau Server and Tableau Online, the data sample size is subject to limits set by your administrator.

*** Input unions can't be edited or created in Tableau Server or Tableau Online. Only in Tableau Prep Builder.

**** Script steps can't be added when creating or editing a flow in Tableau Online. This is currently supported only in Tableau Prep builder and Tableau Server.

Autosave and working with drafts

When you create or edit flows on the server, your work is automatically saved as a draft every few seconds so that in the event of a crash, or when closing a tab by accident, you don't lose your work.

Drafts are saved to the server and project you are signed into. You can't save or publish a draft to another server, but you can save the flow to another project on that server using the File > Publish As menu option.
Draft content can only be seen by you until you publish it. If you publish changes and need to revert them, you can use the Revision History dialog to view and revert to a previously published version. For more information about saving flows on the web, see Automatically save your flows on the web.

Publishing flows on the web

Whether you create a flow from scratch on the web or edit an existing flow, before you can run the flow you’ll need to publish it.

- You can only publish draft flows to the same server you are signed into.
- You can publish a draft to a different project using the File menu and selecting Publish As.
- You can embed credentials for your flow's database connections to enable the flow to run without having to manually enter the credentials when the flow runs.

Embed credentials

Embedding credentials only applies to running flows on your server. Currently, you will manually need to enter your credentials when editing a flow connected to a database. Embedding credentials can only be set at the flow level and not at the server or site level.

Do one of the following:

- From the top menu, select File > Connection Credentials > Embed in Published Flow.
When publishing a flow, select the **Embed credentials** check box. This option shows when you select **Publish As** to publish the flow to a new project for the first time or when you are editing a flow that was last published by someone else.

Publish a flow

When you publish your flow, it becomes the current version of the flow and can be run and seen by others who have access to your project. Flows that are never published or flow...
changes that you make to a draft can only be seen by you until you publish the flow. For more information about flow statuses, see Automatically save your flows on the web.

To publish your flow, do one of the following:

- From the top menu, select **File > Publish** or **File > Publish As**

- From the top bar, click the **Publish** button or click the drop arrow to select **Publish As**.

Who can do this

- Server Administrator, Site Administrator Creator, and Creator allow full connecting and publishing access.
- Creator can perform web authoring tasks.
Create, Interact with, and Embed Views on the Web

You can create and interact with views on Tableau Online. For more information, see the following topics in the Tableau Help for users.

Using Tableau on the Web
Tour your Tableau Site
Edit Views on the Web
Join your Data
Create a Dashboard
Create a Story
Embed Views and Dashboards in Web Pages
Make Workbooks Compatible Between Versions

Alerts and subscriptions

Troubleshoot Subscriptions
Send Data-Driven Alerts from Tableau Online or Tableau Server
Web Authoring and Tableau Desktop Feature Comparison

For anyone familiar with Tableau Desktop and new to the web authoring environment in Tableau Server and Tableau Online, 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 summarizes core authoring functionality and does not cover every difference between the desktop and web environments.

Features listed by version

For a list of the latest web editing features to be added to each release, see the web authoring sections in What's New in Tableau and What's New in Tableau Online, or check out the Release Navigator viz to filter and compare changes by release.

General differences in web authoring

- Your authoring capabilities are determined by your license level. For an overview of what you can do with each license level, see What can I do with a Tableau site?

- You can access right-click menu actions on fields in the view, but not on every item in the workspace.

- Keyboard shortcuts for web authoring and Tableau Desktop are not the same. For a list of web authoring keyboard shortcuts, see Shortcuts for web authoring.

Web authoring capabilities

In the web environment, you can connect to data and create workbooks from those data sources, or data published through Tableau Desktop. You can edit views created on the
web or published from Tableau Desktop.

Administrators can set at the site level what web authoring abilities users can have. Explorers can edit workbooks, create new workbooks from published data sources, connect to published data sources, and create and edit views, dashboards, and stories. Creators have those same capabilities, but can also create new workbooks, connect to data on the web, and use Ask Data and (in Tableau Online) Dashboard Starters to quickly dive into analysis.

Data management

- **Creators**: Connect to data sources, upload files (text, excel, and Tableau workbooks), or use pre-built Dashboard Starter templates for certain data sources. For more information, see Creators: Connect to Data on the Web.

- **Creators**: Prepare data on the web in the Data Source page. For more information, see Creators: Prepare Data on the Web.

  **Note**: There is a limitation on the number of rows that can be viewed in the Data Source page when authoring data on the web, determined by browser:
  - Internet Explorer: 10,000 rows
  - Other browsers: 100,000 rows

  Independent of browser, the total number of records (rows by columns) that can be viewed in the Data Source page on the web is **3 million**.

  - Run Initial SQL when connecting with some data sources
  - Relate your data to combine data from multiple tables
  - Join data from different tables in the same data source or from different databases using a multi-connection data source
• Add a join calculation

• Union data

• Pivot data

• Copy values in a grid (Ctrl+C, or Command-C on a Mac)

• Edit Data Sources

• Clean data using the Data Interpreter

• Create a Custom SQL query

• **Explorers**: Connect to published data sources.

  • Blend published data sources.

  • Save a data source (embedded in a published workbook) as a separate, published data source.

  • Change aggregation of measures in the view. Change the default aggregation of measures in the Data pane.

  • Search for fields in the schema.

  • Duplicate, hide, or rename fields.

  • 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.

  • Create aliases for members of dimensions.
• Create and edit groups.

• Create and edit sets (conditioned sets are not available)

• Create, edit, and remove parameters. Formatting numbers and dates, and adding comments for the parameter are not supported on the web.

Analytics

• Create, edit, rename, duplicate, and clear sheets (views, dashboards, and stories) in a workbook.

• Use Ask Data to automatically create views.

• Use Explain Data to automatically create views.

• Search for fields in the Data pane with schema search

• Drag fields to the view, Rows, Columns, and different mark types in the Marks card.

• Use Show Me to create views. Also, from the Data pane, select and drag a field of interest to the view area to automatically create a "Show Me" view.

• View underlying data (via tooltips).

• Viz in Tooltip works in web views, but must be configured in Tableau Desktop. Viz in Tooltip worksheets can be hidden, the same way you would hide worksheets used in stories or dashboards.

• Actions work in web views, but must be configured in Tableau Desktop.

• Create and edit calculated fields.

• Create bins from continuous measures, and edit bins.

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

• Create sets and show set controls
• Use the **Analytics** pane to drag reference lines, trend lines, and other objects into the view. Edit reference lines, trend lines, and bands. Create and configure reference distributions on a continuous axis. Adding a cluster, and adding and modifying a forecast, are not supported for the web.

• Create groups by selecting marks in the view and then clicking Group Members (paperclip) in the tooltip for that selection. You can also edit existing groups in the Data pane.

• Create hierarchies by dragging one dimension onto another in the Data pane. **Note:** You can't create hierarchies when fields are already grouped within a folder.

• Change options for interacting with maps, including enabling or disabling pan and zoom, or showing map search, the view toolbar, or map scale. Users can also map units.

• Drill up and down a continuous hierarchy in the view. In a view with a continuous hierarchy, hover near the headers on a continuous axis to display the + and - controls. Click to drill down or up.

• Show labels, totals, and subtotals.

• Show, hide, and format mark labels

• Show and hide titles and captions.

• Show and hide cards for filters and highlighters.

• Show, hide, and resize headers in the view.

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

• Change the view size.

• Show and hide the View Toolbar for any view or dashboard.

• Duplicate a sheet as a crosstab view.
Filtering and sorting

- Use data highlighting.
- Add, edit, and remove filters, and edit filter control layouts.

**Note:** There is a limitation on the number of results that can be filtered when authoring data on Tableau Online or Tableau Server. Only the first 100 results are returned to limit the performance impact one user has when loading a large domain on the server.

- Filter across published data sources.
- Apply filters to multiple sheets
- Create context filters (**Add to Context** option in the Filters shelf) and dependent filters (**Only Relevant Values** option in a filter control shown in a view).
- Apply table calculation filters to totals in the view.
- Show hidden fields, and exclude or remove fields from the view.
- Sort fields in the view in ascending or descending order. Access the **Sort** dialog box by right-clicking a dimension on the Rows or Columns shelf. Nested sorting on dimension values within the context of each pane.
- Drag and drop headers to create a custom sort order within a view.

**Formatting**

- Resize the width of row headers and the height of column headers.
- Edit workbook formatting, including formatting lines.
- Edit worksheet and dashboard titles.
• Edit axes (double-click an axis in the view). Other options available: Synchronize dual axes, clearing the axis range (Reset), and tick mark settings. Enable or disable Dual axis in a field context menu (right-click a measure field on Rows or Columns shelf). Logarithmic scales can be positive or symmetric (includes 0 and negative values).

• Edit number formatting (decimal places, percentage, thousands separator, units, and currency).

• Create, edit, move, and resize point, mark, and area annotations.

• Add and edit dashboards objects, including: horizontal and vertical layout containers, text, images, navigation buttons, web page links, and dashboard extensions.

• Create transparent worksheet backgrounds (set background color to None). Combine transparent worksheets with transparent filters, highlighters, and parameters.

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

• Create, rearrange, and preview device-specific dashboard layouts

• Set a dashboard item’s exact size, position, and spacing.

• Add padding, borders, and background colors around items in dashboards.

• Select a background map in map views.

• Legends per measure. If you create separate color legends for the measures in your view, Tableau assigns the default color palette to each new color legend. To change the color legend for each measure, click the drop-down arrow on the color legend to open the Edit Colors dialog box and select the palette that you want to use. For more details, see Legends per measure.
Set a Site’s Web Authoring Access and Functions

Tableau Server administrators can specify at the site level whether to allow users to edit published views in the web environment and configure other web authoring functionality.

By default web authoring functionality is enabled for all sites. Users with the Web Edit capability can create and 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 and other associated functionality 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.

For information about how to enable authoring for flows on the web, see Create and Interact with Flows on the Web.
Turn web authoring on or off for a site

**Note:** This setting is only available for Tableau Server. Web authoring is enabled for Tableau Online and cannot be turned off.

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. In the **Web Authoring** section, select **Workbooks. Let users edit workbooks in their browser.** to enable the functionality.

   Clear the check box to turn off web authoring for that site.

   **Web Authoring**

   Users with the appropriate permissions can edit content in their browser.

   - Workbooks. Let users edit workbooks in their browser.
   - Flows. Let users edit flows in their browser.

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.

Configure cross-database join options

To improve performance for cross-database joins, users can allow Tableau to perform the join using the live database they are connected to instead of using Hyper. While this option is faster, if Tableau uses the connected database to perform the join, data from the file data source that the user is connected to is temporarily moved into temp tables in the database. Because this moves data outside of Tableau, as an administrator you may want to restrict access to this feature for users with web authoring permissions.

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. In the **Cross-Database Joins** setting, select one of the following options:
   - **Use Tableau or existing databases** - Select this option if you want to allow users to choose whether they want to allow Tableau to use the live database to perform cross database joins.
   - **Use Tableau only** - Select this option to restrict users to use only Hyper to perform cross data-base joins.
If you select **Use Tableau only**, the option to choose how Tableau performs the cross-database join won’t display in the canvas when the user connects to a supported data source and supported database. For more information about this feature, see [Improve performance for cross-database joins](#).

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**Create and Edit Private Content in Personal Space**

Personal Space is a private location for all Explorers and Creators to save or edit when working in a Tableau Site. Content saved in Personal Space can’t be shared with other users, but can be moved to a project when you’re ready for others to see it. Within Personal Space, you can create a new workbook or save a workbook to Personal Space as a separate copy. You can also move existing content you own into Personal Space for editing, then move back to a project later. Explorers can download workbooks in Personal Space, including all data included in the workbook.

**Privacy in Personal Space**

Content saved to your personal space is only visible to you and site administrators. Site administrators can’t directly access any user’s Personal Space or edit content in someone else’s Personal Space, but they can view and manage Personal Space workbooks. Personal Space workbooks appear in administrator search results and as a workbook location.
on the Explore page. In addition, the permissions menu is unavailable when a workbook is in Personal Space because the workbook is private.

**Tableau Catalog and Personal Space**

Starting in 2019.3, Tableau Catalog is available with Data Management on Tableau Server and Tableau Online. For more information, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.

When Tableau Catalog is enabled in your work environment, the information about workbooks you save in your personal space is indexed by Catalog. These workbooks are included in lineage counts, however, only you can see the workbooks. Furthermore, users who browse through the lineage tool see Permissions required instead of information about workbooks in your personal space.

**Collaboration tools**

When a workbook is in Personal Space, some functionality is disabled, including share, metrics, comments, alerts, and subscriptions. Existing alerts and subscriptions to you will continue running, but alerts and subscriptions to others will fail, since the content is now private. Metrics can't be created in Personal Space, but will continue to work if a connected workbook is moved there.

These limitations are removed when the workbook is moved or saved to another location. For example, if a workbook contains comments and moves to Personal Space, existing comments are hidden. Comments restore when the workbook is moved to another location.

**Extract refreshes in Personal Space**

To limit resource consumption, existing extract refreshes continue to run if they've been scheduled, but new extract refreshes can't be scheduled while a workbook is in Personal Space.
Find content in Personal Space

You can access Personal Space from the left navigation menu to see all your Personal Space content or create a new workbook, and can save to Personal Space when creating or editing a workbook anywhere on the site.

You can also see workbooks in Personal Space from the Explore page when All Workbooks is selected, and can filter down to Personal Space content.
Save a workbook to Personal Space

Personal Space works much like a private project for you to save a new or existing workbook from Tableau Online or Tableau Server. Workbooks can’t be published directly to Personal Space from Tableau Desktop.

To save a workbook to Personal Space:

Select **File > Save As**.

Under Location, select **Personal Space**.

**Note:** Explorers can only save workbooks to Personal Space, and and may not see a location selection dialog.
Move workbooks to Personal Space

You can move an existing workbook to Personal Space if you are the owner of the workbook and there is room in your Personal Space. Personal Space storage limits are set by administrators.

To move a workbook to Personal Space:

- Select a workbook, then click the Actions drop-down menu.
- Select Move
- Under Location, Select Personal Space.

Note: Explorers can only save workbooks to Personal Space, and may not see the Move action or location selection dialog.

For more information, see Perform actions in the Manage Web Content help topic.

When you move an existing workbook or data source to Personal Space, tools like share, alerts, and subscriptions become hidden. Existing extract refreshes continue to run if they’ve been scheduled, but users can’t schedule new extract refreshes within their Personal Space.

Existing subscriptions and alerts also continue, but can’t be edited from Personal Space and will fail if other users are recipients. Existing connected metrics will continue to refresh, but the connected view will not be visible to other users.

Move workbooks from Personal Space

When you move a workbook out of Personal Space, collaboration tools like share, alerts, and subscriptions become visible, and any existing comments reappear.
Create a Tableau Data Story (English Only)

If you’ve ever written an executive summary of your Tableau dashboard, then you know it can be time-consuming. It takes time to choose which insights to share, and you have to rewrite your summaries each time the data is updated. Tableau Data Stories automatically generates narrative insights within your dashboard, saving time and surfacing relevant insights. As you explore the vizzes in your dashboard, the stories written by Data Stories adjust, allowing you to dive deeper into data and identify key insights faster.

From where you’re already working in Tableau, you can quickly add the Data Story object to your dashboard. And you can customize the terms and metrics used in your story, so Data Stories speaks the language used by your business.

Today, you can create a Tableau Data Story in English in both Tableau Desktop and Tableau Online. To create a Tableau Data Story, you must use a published data source. After you create your story, you can also view your Data Story in Tableau Mobile.

Add a Tableau Data Story to a Dashboard

After you Create a Dashboard, you can add the Data Story object to your dashboard to display insights about your viz that are written in natural language. Today, Tableau Data Stories are available for English only, and Data Stories require published data sources. There is no data size limit when creating Data Stories. However, story generation times out after 45 seconds if it’s trying to analyze a lot of data. We recommend using Data Stories with visualizations that have 1,000 or fewer data points.

**Note:** Tableau Data Stories opens in a pop-up window, so be sure to allow pop-ups. If you’re using full screen mode, then Data Stories can open in a new tab.

1. Drag the Data Story object into your Tableau dashboard. If you haven’t already, add a sheet to your dashboard to use Tableau Data Stories.
2. In the Data Story dialog box, configure your story by first choosing the worksheet to write about.
3. Choose the dimensions and measures to include in your story.

Drag and drop fields to include in your narrative.

**Dimensions**

- Country/Region
- Region

**Measures**

- AVG(GDP)
- AVG(Tourism Inbound)
- AVG(Tourism Outbound)

**Ignored**
4. Choose the type of story that best describes your data:

Choose the option that best describes your data. You can see a preview in the container.

- **Discrete** (best fit)
  For qualitative values such as names or dates.

- **Continuous**
  For quantitative values over time.

- **Percent of Whole**
  For proportions of a whole.

- **Scatter Plot**
  For relationships between numerical variables.

5. Click **Done**.

To filter your Data Story by clicking different sections on your visualization, open the menu on your visualization and click **Use as filter**.
After your story is generated, click Settings at the top of your Data Story object for a guided experience that helps you personalize and contextualize your story. For more information, see Configure Settings for a Tableau Data Story.

**Note:** If you experience a discrepancy in your Tableau Data Story (for example, if the numbers in your story are different than in your visualization), it may be caused by way your visualization is set up. Try creating a new visualization on a different sheet, and then add a new Data Story with the Use a hidden sheet technique to uncover the underlying issue.

### Choose the Right Story Type for Your Tableau Data Story

When you Add a Tableau Data Story to a Dashboard, it’s important to choose the right type of story for your data. Do you want your story about trends over time? Or do you want your story about two values that you’re comparing? To help you tell the right story, this topic describes the different types of stories, including an example of each story type.

**Continuous**

Continuous stories are best for analyzing trends or progress over time.

When you create a continuous story, it includes content for performance, segments, volatility, and trend lines. The story also includes contribution analysis and correlation for stories that use more than one dimension. To use a continuous story, your worksheet must have:

- 1 dimension that has between 1-10 measures
- 2 dimensions and up to 3 measures

The following example is a continuous story for a line chart that has a single dimension and multiple measures:
Discrete

Discrete stories are best for comparing values and understanding the distribution of data in each value. When you create a discrete story, the story includes content about the distribution and groupings or clusters across the data. And the story includes contribution analysis for worksheets that use multiple dimensions.

Consider using a discrete story when you want to:

- Understand drivers of your key performance indicators (KPIs) in sales reports.
- Identify and understand outliers quickly during data discovery.
- Identify trends that aren’t easily observable in the visual when performing an audit.
- Uncover complex utilization insights instantly for geographic analysis.
- Identify and call out key relationships, for example, between sales and profit.

To use a discrete story, your worksheet must have:

- 1 dimension that has between 1-10 measures
- 2 dimensions and up to 3 measures

The following example is a discrete story for a bar chart that has a single dimension and two measures:
Percent of whole

Percent of whole stories are best for pie charts. To use a percent of whole story, your worksheet must have:

- 1 dimension
- 1 measure

The following example is a percent of whole story that uses a pie chart with a single dimension and a single measure:
Scatter plot

Scatter plot stories are best for understanding the relationship between two measures. When you create a scatter plot story, the story includes content about the relationship (regression) between two measures. And the story includes content about groups (clusters) within the data, when they exist.

Consider using a scatter plot story when you want to:

- Call out relationships between two measures to identify impact (regression analysis).
- Identify and understand outliers that are above or below defined thresholds.
- Analyze how your data is distributed.

To use a scatter plot story, your worksheet must have:

- 1 dimension
- 2 or 3 measures

**Note:** When you create your scatter plot story, the first measure you select is treated as the independent variable and the second measure is the dependent variable.

The following example is a scatter plot story that uses a scatter plot that has a single dimension and two measures:
Configure Settings for a Tableau Data Story

After you Add a Tableau Data Story to a Dashboard, you can configure and edit your Tableau Data Story so it’s tailored to your needs—use language specific to your data, specify which analytics are written about, and customize how your Tableau Data Story is displayed.

Configure Tableau Data Story Settings: Analytics

Within your Tableau Data Story, you can choose which analytics to write about and when those analytics are written about. Different types of analytics are available depending on your story type and how many dimensions and measures your story has. However, analytics aren't currently supported for scatter plot story types. For more information, see Choose the Right Story Type for Your Tableau Data Story.

Configure analytics for your story

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the Settings icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the Analytics tab.
4. Click the switches to turn on different types of analytics.
5. For **Segments** and **Trend line**, expand **Settings** to set thresholds for performing those analytics.

6. Click **Save**.

Understand different types of analytics

**Correlation**

Use **Correlation** to identify true statistical correlations between two series. If you have more than two series, then all combinations are analyzed for correlations. For example, you might turn on **Correlation** to identify when two products are often purchased together.

**Clustering**

Use **Clustering** to identify distinct groups of data points (clusters) using a single statistical analysis. For example, you might turn on **Clustering** to identify when a product is very popular in a specific geographic region.

**Distribution**

Use **Distribution** to rank data points relative to each other using nonstatistical observations, such as mean, median, skew, etc. For example, you might turn on **Distribution** to identify which product has the highest profit ratio.

**Segments**

Use **Segments** to highlight noteworthy changes to data points within a series. First, set the minimum percentage of change that you want to be written about in a segment. Changes that fall below your defined threshold aren’t written about. For example, if you set your segment threshold for changes that are greater than 60%, then your story doesn’t write about a trough in a time series that features a 30% decrease.

After you’ve set your threshold, choose whether to **Apply formatting**, and set the minimum percentage of change that you want formatted.
Trend line

Use **Trend line** to calculate a linear best fit line and identify data that falls within a defined percentage of confidence. Data that has high variability has a lower confidence level than data that's more consistent, and that confidence level affects whether trend lines are written about. You can use trend lines for stories that have one dimension and one measure, or you can use trend lines in a drilldown. For more information about drilldowns, see Configure Tableau Data Story Settings: Narrative.

Set the minimum percentage of confidence for your trend line. If you set your threshold at 95%, but a trend line could be drawn at 90% confidence, then your story doesn’t write about trend lines. After you’ve set your threshold, choose whether to **Apply formatting**. Then set the minimum percentage of change that you want formatted.

Tableau Data Stories about trend lines communicate the absolute change over a period. The story written about your trend line varies depending on the level of verbosity you set for your story. If your story uses high verbosity, then your story writes about the R-squared value, which is a statistical concept that quantifies how well your data fits the trend line. For more information about verbosity settings, see Configure Tableau Data Story Settings: Narrative.

Within the **Trend line** settings, you can also choose how many periods into the future for which you want your story to write predictions. When you use predictions, your story uses the slope and intercept of the trend line to calculate predicted values for future periods. The confidence of the prediction adds upper and lower bounds to the confidence threshold you set for trend lines. You can use predictions when your story has at least 30 data points that are linear.

**Volatility**

Use **Volatility** to analyze standard deviations over time. For example, use **Volatility** when you want your story to write about values that fall outside the average range for your data.

Break down how analytics are used to generate stories

At this point, you might be wondering how the analytics for different story types work. Let’s take a look at an example for each story type and break down each sentence in the story.
Understand analytics for discrete stories

Because continuous stories measure trends over time, Data Stories writes about performance, progression, averages, totals, streaks, volatility, segments, and predictions.

The following example of a continuous story is about sales per month:

<table>
<thead>
<tr>
<th>Example story</th>
<th>Story breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Average Sales was $47,858 across all 48 months.</td>
<td>The first two sentences use average and range functions to write about the average, maximum, and minimum values across the period you’re analyzing.</td>
</tr>
<tr>
<td>• The minimum value was $4,520 (February 2014) and the maximum was $118,448 (November 2017).</td>
<td></td>
</tr>
<tr>
<td>• Sales increased by 489% over the course of the series but ended with a downward trend, decreasing in the final month.</td>
<td>The third sentence is about overall performance of the measure over the period. For example, a sentence can be about whether sales increased, decreased, or trended differently during a specific period.</td>
</tr>
<tr>
<td>• The largest single increase on a percentage basis occurred in March 2014 (+1,132%). However, the largest single increase on an absolute basis occurred in September 2014 (+$53,666).</td>
<td>The fourth sentence uses progression analysis. This sentence writes about the largest increase and decrease based on the measure during the period using both a percentage basis and absolute basis.</td>
</tr>
<tr>
<td>• Sales experienced cyclicality, repeating each cycle about every 12 months. There was also a pattern of smaller cycles that repeated about every three months.</td>
<td></td>
</tr>
<tr>
<td>• Sales had a significant positive peak between October 2014 ($31,453) and February 2015 ($11,951), rising to $78,629 in November 2014</td>
<td></td>
</tr>
<tr>
<td>• The overall linear trend of the series rose at $902 per month for an absolute change of $42,394 over the course of the series.</td>
<td></td>
</tr>
</tbody>
</table>
2014 (+$53,868).

- Of the three series, the strongest relationship was between Corporate and Home Office, which had a moderate positive correlation, suggesting that as one (Corporate) increases, the other (Home Office) generally does too, or vice versa.

- Sales experienced cyclicality, repeating each cycle about every 12 months. There was also a pattern of smaller cycles that repeated about every three months.
- Sales had a significant positive peak between October 2014 ($31,453) and February 2015 ($11,951), rising to $78,629 in November 2014.
- The overall linear trend of the series rose at $902 per month for an absolute change of $42,394 over the course of the series. If this trend continued for the next one month, Sales is predicted to be about $69,958.

This sentence is a Correlation insight. This type of analytic insight writes about notable correlations between different series in your data.

This sentence is a Segment insight. This type of analytic insight writes about noteworthy increases and decreases over time.

This sentence is a Trend line insight. This type of insight writes about how well trends fit your data with a certain percentage of confidence, and trend lines allow you to make predictions based on historic trends.

Understand analytics for discrete stories

Because discrete stories allow you to compare values and understand the distribution of the data, the story writes about distribution, averages, totals, and groupings or clusters across the data.

The following example of a discrete story is about sales by product:
This analysis measures Sales by product.

- **Total Sales** is **$2.3 million** across all **17** products.
- The Sales of **$2.3 million** was driven by Phones with **$330,007**, Chairs with **$328,449** and Storage with **$223,844**.
- The distribution ranges from **$3,024** (Fasteners) to **$330,007** (Phones), a difference of **$326,983**, averaging **$135,129**.
- The distribution is positively skewed as the average of **$135,129** is greater than the median of **$114,880**.
- Sales is somewhat concentrated with **eight** of the **17** products (47%) representing **78%** of the total.
- The top **two** products represent over a quarter (29%) of overall Sales.
- **Phones ($330,007)** is more than **two** times bigger than the average across the **17** products.

### Example story

| Story breakdown |
|-----------------|--------------------------------------------------|
| The first sentence calculates the total value of your measure. |
| The second sentence writes about the dimension drivers. In this example, the dimension drivers are the products that contributed the most to total sales. |
| The third and fourth sentences analyze the distribution of the data. This analyzes the averages, medians, concentration of data (if any exist), and how the data is skewed. This helps identify how balanced these grouped variables are compared to one another. |
| This sentence uses **Clustering** to write about measures that can be grouped. This helps identify whether there are distinct groups that stand out in the data. |
| The final sentence writes about notable outliers. |
Understand analytics for scatter plot stories

Scatter plot story types are best used to understand the relationship between two measures, and for that reason, scatter plot stories require 2–3 measures. The scatter plot analysis writes about the relationship (regression) between two measures, and it writes about groups (clusters) within the data, if they exist.

The following example of a scatter plot story is about profit and sales across a dimension:

<table>
<thead>
<tr>
<th>Example story</th>
<th>Story breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>As quantity increased and profit increased, sales increased based on the data provided. Specifically, when quantity increased by 1, sales increased $49.55, and when profit increased by $1.00, sales increased $1.20. Few customers deviated from this</td>
<td>The first two sentences are powered by regression analytics. Regression shows how one measure affects another. Notice that in the first sentence, the story has identified a relationship between profit and sales.</td>
</tr>
</tbody>
</table>

This analysis measures profit, quantity and sales across 793 customer.

- As quantity increased and profit increased, sales increased based on the data provided. Specifically, when quantity increased by 1, sales increased $49.55, and when profit increased by $1.00, sales increased $1.20.
- Few customers deviated from this general relationship, indicating a good fit.
- When organized into groups of similar profit, quantity and sales values, one distinct group stands out. There were 651 customers that had values of profit between -$6,626 and $1,488, quantity between 2 and 122 and sales between $4.83 and $5,690.
- Tamara Chand, Raymond Buch and Sanjit Chand, among others were outliers with high profit and sales values. Sean Miller stood out with a low profit and high sales value.
- The minimum value for profit is -$6,626 (Cindy Stewart) and the maximum value is $8,981 (Tamara Chand), a difference of $15,608. The average profit per customer is $361 and the median is $228.
- The minimum value for quantity is 2 (Anthony O'Donnell) and the maximum value is 150 (Jonathan Doherty), a difference of 148. The average quantity per customer is 47.76 and the median is 44.
- The distribution of sales ranges from $4.83 (Thais Sissman) to $25,043 (Sean Miller), a difference of $25,038. The average sales per customer is $2,897 and the median is $2,256.
When organized into groups of similar profit, quantity and sales values, one distinct group stands out. There were 651 customers that had values of profit between -$6,626 and $1,488, quantity between 2 and 122 and sales between $4.83 and $5,690.

- Tamara Chand, Raymond Buch, and Sanjit Chand, among others were outliers with high profit and sales values. Sean Miller stood out with a low profit and high sales value.

- The minimum value for profit is -$6,626 (Cindy Stewart) and the maximum value is $8,981 (Tamara Chand), a difference of $15,608. The average profit per customer is $361 and the median is $228.

- The minimum value for quantity is 2 (Anthony O'Donnell) and the maximum value is 150 (Jonathan Doherty), a difference of 148. The average quantity per customer is 47.76 and the median is 44.

- The distribution of sales ranges from $4.83 (Thais Sissman) to $25,043 (Sean Miller), a difference of $25,038. The average sales per customer is $2,897 and the median is $2,256.
Understand analytics for percent of whole stories

Percent of whole story types are best for understanding what part of a whole a dimension or measure represents.

The following example of a percent of whole story is about sales by segment:

This analysis measures sales by segment as a percentage of the whole.
- Total sales is $2.3 million across all three segments.
- The minimum value is 19% (Home Office) and the maximum is 51% (Consumer), a difference of 32%.
- The average sales per segment is $765,734.

<table>
<thead>
<tr>
<th>Example story</th>
<th>Story breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Total SUM(Sales) is 2.3 million across all three entities.</td>
<td>The first sentence calculates the total value of your measure.</td>
</tr>
<tr>
<td>• The SUM(Sales) of 2.3 million was driven by Consumer with 1.2 million, Corporate with 706,146 and Home Office with 429,653.</td>
<td>The second sentence writes about drivers. In this example, the drivers are segments that contributed the most to total sales.</td>
</tr>
<tr>
<td>• The minimum value is 429,653 (Home Office) and the maximum is 1.2 million (Consumer), a difference of 731,748, averaging 765,734.</td>
<td>The final sentence analyzes the distribution of the data.</td>
</tr>
</tbody>
</table>

Configure Tableau Data Story Settings: Characteristics

Within your Tableau Data Story, you can configure the characteristics settings to give context to your data, so you get more insightful stories. For example, in your story you can specify that in the context of sales, a higher number is good. But in the context of customer complaints, a higher number is bad.
Use dimension and measure characteristics

Your story and number formatting adjusts based on what the measure is. By default, your story writers all measure values as numbers, and your story won't perform any additional calculations or apply any special rendering rules.

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the Settings icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the Characteristics tab.
4. Configure your formatting, such as number type, decimal places, and negative values.
5. Click Save.

Learn more about measure characteristics

Formatting

If values are formatted as **Percentages**, then the story writes about percentage point differences, rather than percent changes as a story would for number values. When you format a number as a **Percentage** in the Characteristics tab, the Data Story multiplies the value of the number by 100 to create the percentage that shows in your story.

If values are formatted as **Currency**, then you can specify your preferred currency. You can also specify how you want large values (numbers greater than one million) formatted, for example $1.3 million instead of $1,300,000.00.

For both **Numbers** and **Currency**, you can specify how you want large values and negative values to be written about. If you choose to have negative values written about in parentheses, you might see nested parentheses in your story when the negative value is written about in a parenthetical phrase.

When you choose **Number** formatting, you can also specify whether you want numbers less than or equal to 10 to be spelled out (rather than using a numeral) in your story.

For decimal places, **Dynamic** is the default option. This means that the story rounds to different decimal places depending on how large or small the number is. If the percent value is
less than 10, then the number has two decimal places. If the percent value is greater than 10, then the number rounds to the nearest whole number. You can also specify how many decimal places you want used, which is used consistently throughout your story.

Content

You can assign meaning to larger values. For example, larger values for sales are good, but larger values for losses are bad.

In addition, you can choose how to aggregate values by sum or average. It’s a best practice to choose the same aggregation method that you’re using in the viz. For ratio measures, choose **Average** and then define the ratio by selecting the component measures of that ratio measure. Measures that are components of a ratio must be summable.

For cumulative measures (available for continuous stories only), choose **Sum** and then specify that the measure is already cumulative. Continuous stories write about the total of the measure across the series.

Sorting

To sort dimension values, click the arrow up/down icon to sort based on the oldest or newest time values in your dimension.
Configure Tableau Data Story Settings: Display

You can configure how the text in your Tableau Data Story is displayed, such as font color and size. You can also choose whether your story uses bulleted lists or paragraphs.

Configure the display for your story

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the Settings icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the Display tab.
4. Choose whether you want your story structure to be Bullets or Paragraphs.
5. Choose your Font Size.
6. Pick colors to represent good and bad changes (available for continuous stories).
7. Choose whether to use Dynamic Ordering.
8. Choose whether to use a Condensed View.
9. Click Save.

Understand when to use story display settings

To use color, your story must be continuous. When using color, you can choose colors from the palette to represent good changes and bad changes. For your story to know whether a change is good or bad, you must assign meaning to larger values in the Characteristics tab. For more information, see Configure Tableau Data Story Settings: Characteristics. After you configure your display, the styles and colors are applied in your story based on thresholds for trend line or segment analytics.

If you turn on Dynamic Ordering, then the insights for measures in a story are dynamically ordered from the best to the worst average value. If you already have an order you want to maintain, turn off Dynamic Ordering.
If you turn on **Condensed View**, then additional space is removed from your story. This is helpful if you don’t have much extra space in your dashboard or when you have multiple Data Story objects in a dashboard.

**Configure Tableau Data Story Settings: Drivers**

Hypothetically, let’s say your month-over-month sales increased significantly. What drove that increase in sales? And what might have detracted from (offset) those increased sales? Setting up drivers in your Data Story can answer those questions.

In Data Stories, drivers contribute toward a total value. Offsetters detract from a total value. You’ll find insights about drivers and offsetters in discrete and continuous stories. And these insights make it easy to understand exactly what’s going on in the data and why.

Set dimension drivers

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the **Settings** icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the **Drivers** tab.
4. From the **Dimension Drivers** section, select the type of driver that has the greatest impact on your analysis:
   - For **Count**, set the maximum number of contributors and offsetters.
   - For **Individual %**, set thresholds for writing about individual contributors and offsetters.
   - For **Cumulative %**, set thresholds for writing about contributors and offsetters based on their collective value.
5. Click **Save**.

**Understand dimension driver types**

- **Count** specifies the number of entities (contributors and offsetters) called out in your story. For example, use **Count** to see the top three contributors and offsetters in your data.
- **Individual %** sets a threshold, and values higher than that threshold are included in your story. For example, use **Individual %** to specify that you want to write about only entities that represent more than 5% of the total value.
- **Cumulative %** sets a percentage threshold of the total value that included entities collectively account for. For example, use Cumulative % to specify that you want to write about the entities that contributed to at least 90% of that total value. In this example, entities are written about in order of magnitude until the cumulative value of those entities account for 90% of the total value.

Use secondary contributors

To use secondary contributors, you must have a second dimension that isn't time. When you use secondary contributors, each driver that is written about also has details about and drivers for its secondary contributor. For example, if you are analyzing store sales, a secondary contributor would be a class within a department. Secondary contributors allow for deeper analysis. But secondary contributors can also contain a lot of information to fit into a single sentence in your story.

Set metric drivers

For measures that are composed of other subcategory measures, driver analysis can explain the impact that each measure had on the top-level value. For example, material costs and operating costs contribute to total cost.

To use metric drivers, you must have multiple measures for metric analysis. Then, you can specify the relationships between each measure.

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the **Settings** icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the **Drivers** tab.
4. From the **Metric Drivers** section, first choose the measure that is a subcategory of another measure.
5. Then, choose the measure that is the primary category.
6. Click **Save**.

**Tip:** The verbosity setting also applies to drivers. By changing your story’s verbosity setting, you can adjust the way insights are written. If you use high verbosity, then you’ll see more information in parentheses. If you use low verbosity, then you’ll get a more concisely written
insight about your drivers. For more information, see Configure Tableau Data Story Settings: Narrative.

Configure Tableau Data Story Settings: Narrative

You can customize the narrative settings of your Tableau Data Story. Specifically, you can specify the verbosity and level of analytical detail in your story, and you can add terms that are unique to your data. These settings help you write a story that uses the right language and speaks to the right level of detail for your dashboard.

Set verbosity

Verbosity specifies the length and analytical detail written in your story. If you choose high, then your story has longer insights with more analytic analysis. If you choose low, then your story is more concise with fewer details.
If you allow viewers to change verbosity, then viewers of published dashboards can change the level of verbosity in the Data Story object. This is helpful when your dashboard is used by a broader audience with viewers who want varying levels of detail from your story.

Set drilldowns

A drilldown includes two dimensions, and drilldowns describe figures associated with each dimension of your dashboard.

Let's say you have a dashboard that has monthly sales by product category. Your story is configured to write about both the Time and Category dimensions. In this case, this story includes an insight for each Category that describes its performance in and across the Time dimension.

By setting the maximum number of drilldowns, you can control how many insights are included in your story. Drilldown insights are also ranked based on the meaning assigned to the measure characteristics. As the number of drilldowns is reduced, the lowest performing measures (measures that are assigned a Bad meaning) are eliminated.

Add dimension terms

By adding terms, you can define the way each of your measures and dimensions are labeled and referenced in your story.

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the Settings icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the Narrative tab.
4. Expand the dimension to see how it will be written about in both singular and plural form.
5. Click Add Term to add another variation for your story to use to describe your dimension.
6. Click Save.

Your story uses (at random) the terms you've added when writing about a dimension.
Manage measure labels

Similarly to dimensions, you can manage labels used for measures in your story.

1. From the Narrative tab, expand the measure to see its label.
2. Enter the new label that you want used for your measure.
3. Click Save.

Configure Tableau Data Story Settings: Relationships

The Relationships setting allows you to assign relationships between measures in a Tableau Data Story that has multiple measures. To configure Relationships, your story must have one dimension and multiple measures. For more information, see Create Custom Measure Relationships in Your Tableau Data Story.

There are two types of relationships:

- Actual vs. Benchmark
- Current/Most Recent vs Previous Period

Use Actual vs. Benchmark when you want to know if you’re performing above or below your performance benchmarks, for example, when performing quota reporting. This type of relationship is also helpful for identifying data points that require additional analysis because they’re significantly above or below your benchmark. To use Actual vs. Benchmark, the measures you’re comparing must have the same value type.

Use Current/Most Recent vs. Previous Period when you want to see if your key performance indicators (KPIs) are increasing, decreasing, or remaining consistent over time. To use Current/Most Recent vs. Previous Period, you must use a discrete story type. For more information, see Choose the Right Story Type for Your Tableau Data Story.

Additionally, you can use Actual vs. Benchmark and Current/Most Recent vs. Previous Period relationships simultaneously. Measures in your viz that aren’t part of the configured relationships are written about in separate paragraphs.
Create Actual vs. Benchmark relationship for continuous or discrete stories

Use the **Actual vs. Benchmark** relationship when one measure is a benchmark for other measures. For example, you could compare actual sales to a sales target, so your story writes insights about whether you outperformed or underperformed your goal. When you use this type of relationship, the story removes unnecessary content and focuses on what’s most important—comparing a metric to its associated benchmark.

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the **Settings** icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the **Relationships** tab.
4. Check the box for **Actual vs. Benchmark**.
5. First, select the measure that is the benchmark.
6. Then, select the measure that you want to compare against the benchmark.
7. Click **Save**.

Create Current/Most Recent vs. Previous Period relationship

Use the **Current/Most Recent vs. Previous Period** relationship to compare the performance of two measures over a period. For example, you could compare two products to see which product generated the most revenue over the last year.

1. Add a Tableau Data Story to a Dashboard.
2. From your dashboard, click the **Settings** icon at the top-left corner of your Data Story object.
3. In the Data Story dialog box, click the **Relationships** tab.
4. Check the box for **Current/Most Recent vs. Previous Period**.
5. First select the measure for the previous period.
6. Then, select the measure for the current period.
7. Enter the label for the period that you’re measuring, for example, year.
8. Choose the number of periods to measure.
9. Click **Save**.
Customize Your Tableau Data Story

You can use custom language, tailored to your audience, to supplement your Tableau Data Stories with insights specific to your business. Identify the analytics and data from the Data Story that matters most to your audience, and use your own language to create the most impactful story. As with the overall Tableau Data Story, data and variables used in custom content are dynamic, adjusting along with the dashboard.

Add your own insights

1. In your Data Story, click Edit to open the Edit dialog box.
2. Find the section you want to write about and click Add Custom Item.
3. Enter your custom text in the field that appears.
4. Click Save.

Add headers and footers

You can insert custom text at the top and bottom of your Data Story. With headers and footers, you can add your own qualitative analysis to stories, include additional explanations of data trends, or append legal and privacy disclaimers.

1. In your Data Story, click Edit to open the Edit dialog box.
2. Click the Show note switch.
3. Enter your custom note.
4. Click **Save**.

Your note now shows at the top or bottom of your **Data Story**.

**Add functions**

Using a function in your Data Story is a great way to customize your story and find the insights that are most important to you and your business.

For example, if you want to know the average sum of tourism revenue over a period, select **Average** as your function and then designate the measure as **SUM(Tourism Inbound)**. This returns the average sum of inbound tourism.

1. In your **Data Story**, click **Edit** to open the Edit dialog box.
2. Click the menu in the right side of the box and select **Add Function**.
3. Select a Data Story Function and fill in the required fields.
4. Click **Add to Section**.
5. Click **Save**.

The custom content now shows in your Data Story.
Add conditions

For each custom sentence you write, you can add a condition that determines whether the sentence renders in your **Data Story**. If the condition is met, the custom sentence appears in your story. If the condition isn't met, the custom sentence doesn't appear.

You can apply multiple conditions to each custom sentence, and the conditions can be combined using the **Any** or **All** buttons within the Add a condition dialog box.

Conditional statements are most often used with numerical comparisons, but the function also supports string matching using the equal (=) or not equal (!=) symbols.

1. In your Data Story, click **Edit** to open the Edit dialog box.
2. Enter your custom sentence.
3. Click the menu on the right side of the box and select **Add Condition**.
4. Define the custom function to be used to inform the conditional logic. In this example, the sentence "We have met our quota" shows if the Sum of Tourism Inbound is greater than 5 trillion.

   ![Add Condition Dialog](image.png)

5. Click **Add to Section**.
6. Click **Save**.

The custom sentence now appears in your Data Story only if the conditions are met.
Duplicate custom content

You can easily duplicate custom content added to your Data Story, making it easier to build different variations of a sentence. We recommend copying a fully built custom sentence when applying thresholds, building in language variation, and creating different logical variations.

1. In your Data Story, click **Edit** to open the Edit dialog box.
2. Create a custom sentence, complete with functions and conditions, if desired.
3. In the completed sentence box, Click the menu in the right side of the box and select **Duplicate**.
4. Click into your duplicated sentence, update as desired, and click **Add to Section**.
5. Click **Save**.

When you copy a sentence, all functions and conditional statements also copy over. The copied bullet appears directly below the original bullet in the same section.

**Note:** Copied bullets can only be added to the section that the original bullet is in.

Add custom content in drilldown sections

For stories that have two dimensions, each section after the first section is called a drilldown section. Drilldown sections focus on an individual primary dimension entity (i.e. The Americas in the following example).

Because the drilldown sections have the same content structure, custom content added in the first section (i.e., Europe) are applied to each additional section (i.e., The Americas). You can only create or edit content in the first drilldown section.
1. In your Data Story, click **Edit** to open the Edit dialog box.
2. In the first drilldown section, click **Add Custom Item** to each entity.
3. Enter your custom content.
4. Click **Save**.

Custom content in drilldown sections already has a context variable called Current Category value (dynamic). This creates a dimension value option called Current Category value (dynamic) which always represents the section that the drilldown section is about.

**Tip:** To create content that only appears in a single specific drilldown section, you can use conditional logic to ensure it only writes where appropriate.

**Customize Your Tableau Data Story: Context Variables**

Context variables are functions that can be referenced by other functions. In other words, you can use context variables to nest functions within other functions.

After you define your context variable, it appears as a function that you can use when adding new functions to your Tableau Data Story.
**Note:** You can have multiple context variables set for each custom sentence, but you must define each context variable separately for each piece of custom content.

Set a context variable

1. In your **Data Story**, click **Edit** to open the Edit dialog box.
2. Click **Add Custom Item**.
3. Click the menu in the right side of your custom content box and select **Set context**.

4. Click **Add context**.
5. Name the context variable and click **Set Function**.
6. Define your custom function and choose a dimension.

7. Click **Add to Section**.
8. Click back into the sentence where you set your context variable.
9. Follow the steps to Add functions.

Now, your context variable is listed as an option in the **Dimension Value** drop-down list when adding your function.

When to use a context variable: reference two or more measures

Let’s say that you want to refer to two or more measures in one analytical sentence in your **Data Story**. Without a context variable, we can write a sentence for only one measure at a time. But if we use a context variable, we can reference more than one measure in one sentence.

To reference two or more measures with a context variable, your **Data Story** must have:

- 1 dimension
- 2 or more measures

1. In your **Data Story**, click **Edit** to open the Edit dialog box.
2. Click **Add Custom Item**.
3. Click the menu in the right side of your custom content box and select **Set context**.
4. Click **Add context**.
5. Name the context variable and click **Set Function**.
6. Define your custom function and choose a dimension.
7. Click **Add to Section**.
8. Click back into the sentence where you set your context variable.
9. Add your first function and fill in the required fields. In this example, we selected **DimensionValueLabel**, and then chose Country/Region from **Dimension**, and then country with the highest GDP (our context variable) from **Dimension Value**.

10. Click **Add to Section**.
11. Add your second function and fill in the required fields. In this example, we selected **Value**, and then chose Country/Region from **Dimension**, SUM(Lending Interest) from **Measure**, and country with the highest GDP (our context variable) from **Dimension Value**.

12. Click **Add to Section**.
13. Click **Save**.
Your Data Story writes a sentence that gives us insight into a secondary measure (Lending Interest) for the country that we're interested in (the country with the highest GDP).

For AVG(GDP):
- Total AVG(GDP) is 348.03 trillion across all five entities.
- The AVG(GDP) of 348.03 trillion was driven by United States with 173 trillion, Japan with 62.36 trillion and China with 40.99 trillion.
- The minimum value is 28.48 trillion (United Kingdom) and the maximum is 173 trillion (United States), a difference of 144.52 trillion, averaging 69.61 trillion.
- United States (173 trillion) is more than two times bigger than the average across the five entities.
- United States, which has the highest AVG (GDP), has a Lending Interest SUM of 0.7 billion.

When to use a context variable: period-over-period analysis

A context variable is helpful when you want to analyze performance over two different periods in your Data Story. You can create a custom sentence that writes about a measure displayed in your drilldown section and compares the measure against different periods, such as year over year or month over month.

To set up a period-over-period analysis, your Data Story must have:

- 2 dimensions: 1 time period dimension (primary) and 1 non-time period dimension (secondary)
- 1–3 measures

1. Create your Data Story.
2. In the Fields dialog box, make sure your time period dimension is ordered first and click Next.
3. In the Story dialog box, select Continuous and click Done.
4. Open the Edit dialog box, and select Add Custom Item in the first drilldown area.
5. Create two context variables that represent your time periods. For example, "Current Quarter" and "Previous Quarter."
6. Create an *increased* sentence by adding custom language and functions. The content of this sentence results in "[CurrentDimensionValueLabel] increased [X%] over the quarter."

7. Type in the function followed by the word "increased" in the custom text box.

8. Add the function that returns the percent change of your measurement during your time period.

9. Click Add to Section.

10. Duplicate custom content and create a *decreased* version by replacing the word "increased" with "decreased." The functions stay the same.
11. Add conditions for each sentence so that only one is written, depending on the data.

12. For the increased sentence, set conditions in line with the following example:

   Left Argument = Value function

   Dimension = Quarter(OrdenDate). Select your time period dimension

   Measure = SUM(Total Orders). Select the measure you used for the calculation

   Dimension Value = Current Quarter. One of the context variables

   Filter Dimension Value = Current Region value (dynamic). This is the preset context variable

   Middle Argument = > (greater than)

   Right Argument = Value function

   Dimension = Quarter(OrdenDate). Select your time period dimension

   Measure = Total(Total Orders). Select the measure you used for the calculation

   Dimension Value = Previous Quarter. One of the context variables

   Filter Dimension Value = Current Region value (dynamic). This is the preset context variable
13. For the *decreased* sentence, set the same conditions, but replace the > (greater than) sign with the < (less than) sign. The right and left arguments remain the same.

14. Click *Save*, and your *Data Story* writes a sentence that includes the insights from analyzing the two time periods.

**Customize Your Tableau Data Story: Functions**

If you’d like to customize your Tableau Data Story with a function, it helps to know what functions you can use, what each function does, and what dimensions and measures you’ll need for each function.

Learn how to Add functions to your Data Story.

Click a letter to see functions that begin with that letter. If no functions start with that letter, the functions that start with the next letter in the alphabet are shown. You can also press Ctrl+F (Command-F on a Mac) to open a search box that you can use to search the page for a specific function.
Tableau Online Help

Average

Description: The average value of the given measure.

Syntax: Average(dimension, measure, filterDimensionValue)

Count

Description: The number of dimension values within a given dimension.

Syntax: Count(dimension)

Difference

Description: The difference in measure values between the two provided dimension values.

Syntax: Difference(dimension, measure, firstDimensionValue, secondDimensionValue, filterDimensionValue)

DifferenceFromMean

Description: The difference between the mean and the measure value for the given dimension value.

Syntax: DifferenceFromMean(dimension, measure, firstDimensionValue, filterDimensionValue)

Direction

Description: Language describing the direction (e.g., increase or decrease) between measure values for the two provided dimension values.
Syntax: Direction(dimension, measure, firstDimensionValue, secondDimensionValue, filterDimensionValue, phrase)

Ending Label
Description: The name of the last period in the series.
Syntax: Label(measure)

EndingValue
Description: The value at the last period in the series for the given measure.
Syntax: EndingValue(measure, filterDimensionValue)

Label
Description: The label for the given measure.
Syntax: Label(measure)

LargestNegativeChangeDifference
Description: The value of the largest negative period-over-period difference, on an absolute basis, in the given series.
Syntax: LargestNegativeChangeDifference(measure, filterDimensionValue)

LargestNegativeChangeEndingLabel
Description: The name of the ending period for the largest negative period-over-period difference, on an absolute basis, in the given series.
LargestNegativeChangeEndingLabel
Syntax: LargestNegativeChangeEndingLabel(measure, filterDimensionValue)

LargestNegativeChangeEndingValue
Description: The ending value of the largest negative period-over-period difference, on an absolute basis, in the given series.
Syntax: LargestNegativeChangeEndingValue(measure, filterDimensionValue)

LargestNegativeChangePercentDifference
Description: The percent change of the largest negative period-over-period difference, on an absolute basis, in the given series.
Syntax: LargestNegativeChangePercentDifference(measure, filterDimensionValue)

LargestNegativeChangeStartingLabel
Description: The name of the starting period for the largest negative period-over-period difference, on an absolute basis, in the given series.
Syntax: LargestNegativeChangeStartingLabel(measure, filterDimensionValue)

LargestNegativeChangeStartingValue
Description: The starting value of the largest negative period-over-period difference, on an absolute basis, in the given series.
Syntax: LargestNegativeChangeStartingValue(measure, filterDimensionValue)
LargestNegativePercentChangeDifference

Description: The value of the largest negative period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestNegativePercentChangeDifference(measure, filterDimensionValue)

LargestNegativePercentChangeEndingLabel

Description: The name of the ending period for the largest negative period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestNegativePercentChangeEndingLabel(measure, filterDimensionValue)

LargestNegativePercentChangeEndingValue

Description: The ending value of the largest negative period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestNegativePercentChangeEndingValue(measure, filterDimensionValue)

LargestNegativePercentChangePercentDifference

Description: The percent change of the largest negative period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestNegativePercentChangePercentDifference(measure, filterDimensionValue)

LargestNegativePercentChangeStartingLabel

Description: The name of the starting period for the largest negative period-over-period difference, on a percentage basis, in the given series.
Syntax: LargestNegativePercentChangeStartingLabel(measure, filterDimensionValue)

LargestNegativePercentChangeStartingValue

Description: The starting value of the largest negative period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestNegativePercentChangeStartingValue(measure, filterDimensionValue)

LargestPositiveChangeDifference

Description: The value of the largest positive period-over-period difference, on an absolute basis, in the given series.

Syntax: LargestPositiveChangeDifference(measure, filterDimensionValue)

LargestPositiveChangeEndingLabel

Description: The name of the ending period for the largest positive period-over-period difference, on a absolute basis, in the given series.

Syntax: LargestPositiveChangeEndingLabel(measure, filterDimensionValue)

LargestPositiveChangeEndingValue

Description: The ending value of the largest positive period-over-period difference, on an absolute basis, in the given series.

Syntax: LargestPositiveChangeEndingValue(measure, filterDimensionValue)
LargestPositiveChangePercentDifference

Description: The percent change of the largest positive period-over-period difference, on an absolute basis, in the given series.

Syntax: LargestPositiveChangePercentDifference(measure, filterDimensionValue)

LargestPositiveChangeStartingLabel

Description: The name of the starting period for the largest positive period-over-period difference, on an absolute basis, in the given series.

Syntax: LargestPositiveChangeStartingLabel(measure, filterDimensionValue)

LargestPositiveChangeStartingValue

Description: The starting value of the largest positive period-over-period difference, on an absolute basis, in the given series.

Syntax: LargestPositiveChangeStartingValue(measure, filterDimensionValue)

LargestPositivePercentChangeDifference

Description: The value of the largest positive period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestPositivePercentChangeDifference(measure, filterDimensionValue)

LargestPositivePercentChangeEndingLabel

Description: The name of the ending period for the largest positive period-over-period difference, on a percentage basis, in the given series.
Syntax: LargestPositivePercentChangeEndingLabel(measure, filterDimensionValue)

LargestPositivePercentChangeEndingValue

Description: The ending value of the largest positive period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestPositivePercentChangeEndingValue(measure, filterDimensionValue)

LargestPositivePercentChangePercentDifference

Description: The percent change of the largest positive period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestPositivePercentChangePercentDifference(measure, filterDimensionValue)

LargestPositivePercentChangeStartingLabel

Description: The name of the starting period for the largest positive period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestPositivePercentChangeStartingLabel(measure, filterDimensionValue)

LargestPositivePercentChangeStartingValue

Description: The starting value of the largest positive period-over-period difference, on a percentage basis, in the given series.

Syntax: LargestPositivePercentChangeStartingValue(measure, filterDimensionValue)
LongestStreakDifference

Description: The difference over the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakDifference(measure, filterDimensionValue)

LongestStreakDirection

Description: The direction (positive or negative) of the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakDirection(measure, filterDimensionValue)

LongestStreakEndingLabel

Description: The name of the ending period for the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakEndingLabel(measure, filterDimensionValue)

LongestStreakEndingValue

Description: The ending value of the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakEndingValue(measure, filterDimensionValue)

LongestStreakLength

Description: The largest number of periods of consecutive increase or decrease for the given series.
LongestStreakLength

Syntax: LongestStreakLength(measure, filterDimensionValue)

LongestStreakPercentDifference

Description: The percent difference over the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakPercentDifference(measure, filterDimensionValue)

LongestStreakStartingLabel

Description: The name of the starting period for the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakStartingLabel(measure, filterDimensionValue)

LongestStreakStartingValue

Description: The starting value of the longest streak of consecutive increases or decreases for the given series.

Syntax: LongestStreakStartingValue(measure, filterDimensionValue)

MaxLabel

Description: The name of the entity with the maximum value for the given measure.

Syntax: MaxLabel(dimension, measure, filterDimensionValue)

MaxValue

Description: The maximum value for the given measure.
Syntax: MaxValue(measure)

Median

Description: The median value for the given measure.

Syntax: Median(dimension, measure, filterDimensionValue)

MinLabel

Description: The name of the entity with the minimum value for the given measure. Syntax:
MinLabel(dimension, measure, filterDimensionValue)

MinValue

Description: The minimum value for the given measure.

Syntax: MinValue(dimension, measure, filterDimensionValue)

PercentDifference

Description: The percent difference in measure values between the two provided dimension values.

Syntax: PercentDifference(dimension, measure, firstDimensionValue, secondDimensionValue, filterDimensionValue)

PercentOfWhole

Description: The percent in measure values for a given dimension value over the total measure values for that dimension.
PercentOfWhole(dimension, measure, dimensionvalue, filterDimensionValue)

PeriodLabel

Description: The name of the nth period in the series, starting at 1.

Syntax: PeriodLabel(index)

PeriodLabelNewest

Description: The name of the nth period in the series, starting at the newest and counting back.

Syntax: PeriodLabelNewest(index)

PeriodValue

Description: The value of the given measure at the nth period in the series, starting at 1.

Syntax: PeriodValue(measure, index, filterDimensionValue)

PeriodValueNewest

Description: The value of the given measure at the nth period in the series, starting at the newest and counting back.

Syntax: PeriodValueNewest(measure, index)

Range

Description: The difference between the maximum and minimum values for the given measure.
Syntax: Range(dimension, measure, filterDimensionValue)

SortAscendingLabel

Description: The entity name of the given measure sorted in descending order at the given rank (starting at 1).

Syntax: SortAscendingLabel(measure, rank, dimension, filterDimensionValue)

SortAscendingValue

Description: The value of the given measure sorted in ascending order at the given rank (starting at 1).

Syntax: SortAscendingValue(measure, rank, dimension, filterDimensionValue)

SortDescendingLabel

Description: The entity name of the given measure sorted in descending order at the given rank (starting at 1).

Syntax: SortDescendingLabel(measure, rank, dimension, filterDimensionValue)

SortDescendingValue

Description: The value of the given measure sorted in descending order at the given rank (starting at 1).

Syntax: SortDescendingValue(measure, rank, dimension, filterDimensionValue)

StartingLabel

Description: The name of the first period in the series.
Syntax: StartingLabel()

StartingValue

Description: The value at the first period in the series for the given measure.

Syntax: StartingValue(measure, filterDimensionValue)

StartToFinishDifference

Description: The difference between the values for the first and last periods in the given series.

Syntax: StartToFinishDifference(measure, filterDimensionValue)

StartToFinishPercentDifference

Description: The percent difference between the values for the first and last periods in the given series.

Syntax: StartToFinishPercentDifference(measure, filterDimensionValue)

StdDev

Description: The standard deviation value for the given measure.

Syntax: StdDev(dimension, measure, filterDimensionValue)

Sum

Description: The sum of measure values for the two provided dimension values.
Syntax: `Sum(dimension, measure, firstDimensionValue, secondDimensionValue, filterDimensionValue)`

**Total**
Description: The sum total value for the given measure.
Syntax: `Total(dimension, measure, filterDimensionValue)`

**Value**
Description: The metric value for a given dimension, measure, and dimension value.
Syntax: `Value(dimension, measure, dimension value, filterDimensionValue)`

**Z-Score**
Description: The z-score for the given measure.
Syntax: `Z-Score(dimension, measure, firstDimensionValue, filterDimensionValue)`

**Customize Your Tableau Data Story: Hide and Reorder Content**
Customize your Tableau Data Story with the content that is most important to you and your audience by hiding or reordering content within your story.

**Hide content and sections**
1. Create your Data Story and click Edit to open the Edit dialog box.
2. Set sections to show or hide by clicking the Show section switch to the on or off position.
3. Hover over the blue box to the right of each individual sentence, and click the box to show or hide from view.
4. Click Save.
Now, only the sentences and sections that are set to Show appear in your Data Story.

Reorder content within a section

1. Create your Data Story and click Edit to open the Edit dialog box.
2. Hover over the left-side menu of the content you want to reorder. Your cursor turns into a hand icon.
3. Click the item with your cursor and drag it anywhere within the same section.
4. Click Save.

Now, the sentences appear in your Data Story in the order that you set them to.
Note: Currently, content can only be moved within the same section. Moving entire sections isn't yet supported.

Add More Data to Your Tableau Data Story

Data Stories currently supports stories with two dimensions and one measure, or one dimension and up to 10 measures. If you'd like to write about data that you don't need to show on your dashboard, then use a hidden sheet to simplify your dashboard. If you'd like to add more than two dimensions to your story, then concatenate dimensions or create multiple data stories and stack them.

Use a hidden sheet

If you have data that you want to include in a Tableau Data Story and don't need to show all the data that drove the insight, you can use a hidden sheet to bring additional measures and dimensions into your story without cluttering the dashboard.

1. Drag the Data Story object to your dashboard to see which worksheets you can write about in the Data Story dialog box. In this example, there are two worksheets available to write about.
2. Bring in another data source, such as "Population," by navigating to the left-hand menu, selecting **Floating**, and dragging that sheet onto your dashboard. The Data Story dialog box updates with the new available data source.

3. Click into **Layout** and adjust the size to 1 x 1 to hide the sheet but keep the underlying data in your story.
You can now configure your stories using this hidden sheet.

**Note:** You may need to deselect additional legend elements to keep the sheet hidden.

**Concatenate dimensions**

If your data contains three dimensions and one measure and is a **Discrete Story**, you can concatenate (link together) two of those dimensions by creating a calculated field.

1. From the worksheet you want to use in your story, click **Analysis** and select **Create Calculated Field**.
2. Name the calculated field and use the following formula to create your calculation, using the + sign to join the dimensions.
   
   \[ \text{[Dimension 1]} + \text{[Dimension 2]} \]

   ![Calculated Field Example]

   **Tip:** Drag your dimensions into the **Calculated Field** box and place them in the formula.

   3. Click **OK**.
   4. Drag your new calculated field into the **Detail** pane to make it accessible in your data story.

**Stack multiple data stories**

Write about more measures and dimensions by creating multiple **Data Stories** and stacking them vertically or horizontally on your dashboard.

For example, if you wanted to create a story about actual revenue vs benchmark revenue, you could create two different stories—one with the actual revenue and the first benchmark, and another with the actual revenue and the second benchmark—and compare them.
Add a Pop-Up Tableau Data Story to Your Dashboard

You can place a Tableau Data Story in a pop-up window that allows your users to open a story, read it, and then close it when they're done. This is a great way to save space being used by already-established dashboards or to reduce the amount of clutter and information on a dashboard.

1. Add a Tableau Data Story to a Dashboard.
2. Set the container to Floating by clicking the menu and selecting Floating.

Tip: Another way to set the container to Floating is by holding the shift key while dragging the container onto your dashboard.

3. Navigate to the Layout tab in the left-hand column and set the background color to white.

4. Click the menu that is associated with your floating container to show its settings, and select Add Show/Hide Button. This creates an "X" icon that allows you to show or hide your story.
Note: If your story is selected, then your button is partially obscured by the sidebar options that are part of the Data Story object. Click anywhere outside of the story to reveal the button.

5. Hover over the "X" icon to show instructions for opening or closing the story. In this example, you’re being prompted to press the Alt key at the same time you click the "X" icon.

6. Collapse the story by clicking the "X" icon at the same time as pressing the key indicated in your prompt.

The story collapses, but the menu remains on the dashboard so that the user can expand the story when needed. You can move your collapsible, floating story around your dashboard as desired.

Create Custom Measure Relationships in Your Tableau Data Story

You can create a relationship story in your Tableau Data Story to see how data compares to another set of data. To build a relationship story, you must have at least two measures and one dimension. Data that you’d like to compare is often grouped into one column of data named something such as "Year" or "Month," with values such as "2022" or "March."

You can Create a Simple Calculated Field to separate "2022" from "2021" (or March from February), so that you can compare the two time periods in a relationship story.

1. Start in the sheet that you want to use in your Data Story.
2. Click Analysis, and select Create a Calculated Field.
3. Create a calculated field such as "Current Period."
Tip: Follow the structure of the calculated field shown here, but substitute your own dimension or measure names (orange text).

4. Create a calculated field such as "Previous Period."

5. Drag the new measures onto the **Detail** mark.
6. From your dashboard, click the story and add the two new measures into your **Data Story**.
7. From your dashboard, click the **Settings** icon at the top-left corner of your Data Story object.
8. In the Data Story dialog box, click the **Relationships** tab.
9. Set up a relationship story with the two custom measures.
10. Click **Save**.

Your story now writes sentences that compare the custom measures.

**Refresh Parameters in a Tableau Data Story**

If you’ve added a parameter to your dashboard and are using Data Stories, you’ll notice that clicking the parameter refreshes your visualization, but not the story. This happens because the parameter doesn’t refresh the underlying data like a filter does.

To refresh your Tableau Data Story with the parameter data, add a "refresh" button to your dashboard that updates your story to align with your parameter.

1. Create a new sheet in your workbook.
2. Create a **Calculated Field** in the new sheet with the following info:

   Name: Refresh

   Contents: "refresh"

3. Click **OK**, and then drag the new calculated field (Refresh) onto your new sheet.
4. Right-click the field and click **Show Header** to hide the header.
5. Choose a shape for your button.

6. Return to your dashboard and drag the sheet containing the refresh button onto your dashboard next to the parameter.

7. Hover over the button, select More Options, and click Title to hide the title.

8. Hover over the button and click Use as Filter.

9. Adjust your parameter and then click on the new refresh button. The button updates your story to align with the parameter.

Use a Table Calculation in a Tableau Data Story

You can use a Table Calculation as a measure in a Tableau Data Story in addition to the measure that you used to create the table calculation.

1. From the Marks card, click the right side of your field to open a menu, and click Quick Table Calculation.
2. After you create your table calculation, drag it to **Measures** in the **Data** pane and rename it.
3. Drag your original measure (e.g., Sales) back to the **Rows** shelf, and then drag your new calculation (e.g., Sum of Sales) into the **Tooltip**. Your visualization may remain the same, but you now have access to the new measure.
4. Go to your dashboard and drag the **Data Story** object onto the dashboard. Both measures appear when creating your story.

**Connect to Published Data Sources in Web Editing**

The steps below describe how to connect to published data sources when you’re signed in to Tableau Server or Tableau Online. For details on how to edit workbooks and view on the web, see **Build Views on the Web** and **Using Tableau on the Web**.
For information about how to connect to a published data source from Tableau Desktop, see Tableau Server or Tableau Online in the Connector Example reference in this help system.

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 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.

Edit a Published Data Source

Imagine that you’ve published a data source, and your team is using the data source across a number of workbooks. This is a good start, but you have some changes in mind that will make your data source great. Before you implement these changes, you want to see how your proposed changes look in Tableau. And most importantly, you need to test your changes to ensure they won’t negatively impact any existing workbooks that use the data source.
Editing a published data source allows you to test changes and make improvements to your data source while maintaining it as a single source of data.

**Edit and test changes**

Whether you're creating a new published data source or editing an existing published data source, you can create joins and edit the schema from the Data Source page without leaving your browser. Then use the Scratchpad to test your changes, create folders, organize hierarchies, and rename fields and aliases before publishing your data source. While editing your data source, you'll have all the same features and functionality that you have when authoring in Tableau Online. For more information, see Web Authoring and Tableau Desktop Feature Comparison.

To edit a published data source:

1. From the Start or Explore page, navigate to the data source you want to edit.
2. Click **Edit Data Source**.

![Edit Data Source](image)

3. Click the **Data Source** page to make joins or edit the schema.
4. Click the **Scratchpad** sheet.
5. From the **Data** pane, create folders, organize hierarchies, rename fields and their aliases, or update metadata that are saved with the published data source.
6. Drag and drop fields onto the scratchpad to make sure your changes are working as expected.
7. Click **Publish**.

Just like you can with workbooks, you can also **Publish As** if you want to make a copy of the data source.
Note: Personal Spaces don’t support published data sources.

Roll back changes

To revert to the last version of the published data source:

1. Navigate to the data source that you want to revert.
2. Click File.
3. Choose Revert to Published.

This reverts to the latest published version of that data source.

Understand supported connections

Editing published data sources doesn’t support:

- Tableau Bridge connectors in Tableau Online.
- Data sources that use embedded passwords in Tableau Online and Tableau Server.
- Databases that use OAuth, including Databricks and Snowflake, aren’t yet supported in Tableau Server.

Also, the Data Source page isn’t available for published data source connection types that aren’t supported, including but not limited to .tde and .hyper file types. To see which connection types are supported, see Creators: Connect to Data on the Web.
Learn about permissions

To edit a published data source, you’ll need a Creator license that has Save or Save As permissions for data sources in the respective folder. For more information, see Permissions.

Edit data sources published by a flow

If you make edits to a data source that was published by a flow, the changes will be overwritten during the next scheduled flow. Instead, edit the data source in the flow. For more information, see Publish a Flow to Tableau Server or Tableau Online.

Autosave Workbooks

In Tableau Online, Autosave saves the edits that you make to a workbook as you work.

How does Autosave work?

To turn on Autosave, click Publish to save your workbook to a designated location. After you publish the first time, we’ll start to autosave the changes that you make to a private draft version of your workbook. When you’re ready to share your changes with others, use Publish to replace the last published revision with your draft.

**Note:** Autosave doesn’t automatically save every type of change, such as specific types of assets. In these cases, you’ll see a notification that you must Publish to save your edits.

Workbook file size

Autosave is available for workbooks that are smaller than 5MB. You must Publish to manually save changes for larger workbook files.
What if multiple users edit the same workbook?

When more than one user works on the same workbook, each user’s edits are associated with and saved to their own private draft. When you begin to edit a workbook, you’ll receive a notification if the version you’re working from has a published revision from another user. You’re then offered a choice to either discard your draft and edit the current revision or to resume editing your private draft.

**Warning:** You won’t receive a notification if another user publishes a revision after you’ve begun your edits to your private draft. If another user publishes their draft before you publish your version, your changes will overwrite theirs.

You can check the workbook Revision History to see when the workbook was last published. From the revision history, you can choose to Preview a revision, or Restore a previous revision. For more information, see Work with Content Revisions.

If you choose to discard your draft to edit the current revision, the draft and associated asset files that were uploaded are deleted. To retain assets and edits that you made in your private draft, you can manually incorporate the edits of other users into your private draft. Then, publish the workbook with both sets of changes.

Permissions requirement

Autosave is available to Creators and Explorers (can publish) with web editing capabilities at the workbook level. If a user has web editing capabilities at the view level only, Autosave won’t be turned on.

Use Relationships for Multi-table Data Analysis

Tables that you drag into this canvas use relationships. Relationships are a flexible way to combine data for multi-table analysis in Tableau.
Think of a relationship as a contract between two tables. When you are building a viz with fields from these tables, Tableau brings in data from these tables using that contract to build a query with the appropriate joins.

We recommend using relationships as your first approach to combining your data because it makes data preparation and analysis easier and more intuitive. Use joins only when you absolutely need to. Learn more about the basics of creating relationships in this 5-minute video.

Note: The interface for editing relationships shown in this video differs slightly from the current release but has the same functionality.

Learn more about how relationships work in these Tableau blog posts:

- Relationships, part 1: Introducing new data modeling in Tableau
- Relationships, part 2: Tips and tricks
- Relationships, part 3: Asking questions across multiple related tables

Also see video podcasts on relationships from Action Analytics, such as Why did Tableau Invent Relationships? Click "Video Podcast" in the Library to see more.

Are you building a new data source and workbook?

Drag a table to the Data Source page canvas to start building your data source.

A data source can be made of a single table that contains all of the dimension and measure fields you need for analysis...
Or, you can create a multi-table data source by dragging out more tables and defining their relationships...
Watch this 1-minute video about getting started with using relationships.

**Note:** The interface for editing relationships shown in this video differs slightly from the current release but has the same functionality.

For more information about using relationships, see Relate Your Data, How Relationships Differ from Joins, The Tableau Data Model, and Create and define relationships.

For more information on changes to data sources and analysis in Tableau 2020.2, see What's Changed with Data Sources and Analysis in 2020.2 and Questions about Relationships, the Data Model, and Data Sources in 2020.2.

**Are you opening an older workbook or data source?**

When you open a pre-2020.2 workbook or data source in 2020.2, your data source will
appear as a single logical table in the canvas, with the name "Migrated Data" or the original table name. Your data is preserved and you can continue to use the workbook as you did before.

To see the physical tables that make up the single logical table, double-click that logical table to open it in the physical layer. You will see its underlying physical tables, including joins and unions.

For more information on changes to data sources and analysis in Tableau 2020.2, see What’s Changed with Data Sources and Analysis in 2020.2 and Questions about Relationships, the Data Model, and Data Sources in 2020.2.

The Tableau Data Model

Every data source that you create in Tableau has a data model. You can think of a data model as a diagram that tells Tableau how it should query data in the connected database tables.
The tables that you add to the canvas in the Data Source page create the structure of the data model. A data model can be simple, such as a single table. Or it can be more complex, with multiple tables that use different combinations of relationships, joins, and unions.

The data model has two layers:

- The default view that you first see in the Data Source page canvas is the logical layer of the data source. You combine data in the logical layer using relationships (or noodles). Think of this layer as the Relationships canvas in the Data Source page. For more information, see Use Relationships for Multi-table Data Analysis.
- The next layer is the physical layer. You combine data between tables at the physical layer using joins and unions. Each logical table contains at least one physical table in this layer. Think of the physical layer as the Join/Union canvas in the Data Source page. Double-click a logical table to view or add joins and unions.

### Logical Layer

- Noodles = Relationships

### Physical Layer

- Venn diagram = Joins

The top-level view of a data source with multiple, related tables. This is the logical layer. Logical tables can be combined using relationships (noodles). They don’t use join types. They act like containers for physical tables.

Double-click a logical table to open it and see its physical tables. Physical tables can be combined using joins or unions. In this example, the Book logical table is made of three, joined physical tables (Book, Award, Info).
**Logical Layer**

- Relationships canvas in the Data Source page
- Tables that you drag here are called logical tables
- Logical tables can be related to other logical tables
- Logical tables are like containers for physical tables
- Level of detail is at the row level of the logical table
- Logical tables remain distinct (normalized), not merged in the data source

**Physical Layer**

- Join/Union canvas in the Data Source page
- Tables that you drag here are called physical tables
- Physical tables can be joined or unioned to other physical tables
- Double-click a logical table to see its physical tables
- Level of detail is at the row level of merged physical tables
- Physical tables are merged into a single, flat table that defines the logical table

**Layers of the data model**

The top-level view that you see of a data source is the **logical layer** of the data model. You can also think of it as the Relationships canvas, because you combine tables here using relationships instead of joins.

When you combine data from multiple tables, each table that you drag to the canvas in the logical layer must have a relationship to another table. You do not need to specify join types for relationships; during analysis Tableau automatically selects the appropriate join types based on the fields and context of analysis in the worksheet.

The **physical layer** of the data model is where you can combine data using joins and unions. You can only use pivots in this canvas. You can think of it as the Join/Union canvas. In previous versions of Tableau, the physical layer was the only layer in the data model. Each logical table can contain one or more physical tables.
**Important:** You can still create single-table data sources in Tableau that use joins and unions. The behavior of single-table analysis in Tableau has not changed. Your upgraded workbooks will work the same as they did before 2020.2.

**Learn more:** For related information on combining data using relationships, also see these topics and blog posts:

- How Relationships Differ from Joins
- Use Relationships for Multi-table Data Analysis
- Relate Your Data
- Relationships, part 1: Introducing new data modeling in Tableau
- Relationships, part 2: Tips and tricks
- Relationships, part 3: Asking questions across multiple related tables

Also see video podcasts on relationships from Action Analytics, such as Why did Tableau Invent Relationships? Click "Video Podcast" in the Library to see more.

**Understanding the data model**

In previous versions of Tableau, the data model had only the physical layer. In Tableau 2020.2 and later, the data model has the logical (semantic) layer and a physical layer. This gives you more options for combining data using schemas to fit your analysis.
In Tableau 2020.2 and later, a logical layer has been added in the data source. Each logical table contains physical tables in a physical layer.

In previous versions of Tableau, the data model in your data source consisted of a single, physical layer where you could specify joins and unions. Tables added to the physical layer (joined or unioned) create a single, flattened table (denormalized) for analysis.

In versions of Tableau before 2020.2, the data model has only the physical layer

In 2020.2 and later, the data model has two layers: the logical layer and the physical layer

In Tableau 2020.2, the data model in your data source includes a new semantic layer above the physical layer—called the logical layer—where you can add multiple tables and relate them to each other. Tables at the logical layer are not merged in the data source, they remain distinct (normalized), and maintain their native level of detail.

Logical tables act like containers for merged physical tables. A logical table can contain a single, physical table. Or it can contain multiple physical tables merged together through joins or unions.

**Build a new model**

When you add one or more tables to the logical layer, you are essentially building the data model for your data source. A data source can be made of a single, logical table, or you can
drag multiple tables to the canvas to create a more complex model.

- The first table that you drag to the canvas becomes the root table for the data model in your data source.
- After you drag out the root table, you can drag out additional tables in any order. You will need to consider which tables should be related to each other, and the matching field pairs that you define for each relationship.
- If you are creating a star schema, it can be helpful to drag the fact table out first, and then relate dimension tables to that table.
- Deleting a table in the canvas automatically deletes its related descendants as well. If you delete the root table, all other tables in the model are also removed.
- Each relationship must be made of at least one matched pair of fields. Add multiple field pairs to create a compound relationship. Matched pairs must have the same data type. Changing the data type in the Data Source page does not change this requirement. Tableau will still use the data type in the underlying database for queries.
- Relationships can be based on calculated fields.
- You can specify how fields used in the relationships should be compared by using operators when you define the relationship.

For more information about relationships, see Create and define relationships in Relate Your Data.

Multi-table model

- To create a multi-table model, drag tables to the logical layer of the Data Source page canvas.
Tables that you drag to the logical layer of the Data Source page canvas must be related to each other. When you drag additional tables to the logical layer canvas, Tableau automatically attempts to create the relationship based on existing key constraints and matching fields to define the relationship. If it can't determine the matching fields, you will need to select them.

If no constraints are detected, a Many-to-many relationship is created and referential integrity is set to Some records match. These default settings are a safe choice and provide the most a lot of flexibility for your data source. The default settings support full outer joins and optimize queries by aggregating table data before forming joins during analysis. All column and row data from each table becomes available for analysis.

You can add more data inside any logical table by double-clicking the table. This opens the physical layer of the Data Source page canvas. If you need to use joins or unions, you can drag the tables you want to join or union into the physical layer canvas. The physical tables are merged in their logical table.

Follow the steps in Create and define relationships to combine multiple tables.
Single-table model

- To create a single-table model, drag a table into the logical layer canvas of the Data Source page. You can then use the fields from that table in the Data pane for analysis.

Single-table model that contains other tables

You can add more data inside the single, logical table by double-clicking the table. This opens the physical layer of the Data Source page canvas. If you need to use joins or unions, you can drag the tables you want to join or union into the physical layer canvas. The physical tables are merged in their logical table.
This example shows the Book table in the Relationships canvas (logical layer) of the data source. Double-clicking the Book logical table opens the Join/Union canvas (physical layer).

In this example, the joins merge the Award and Info tables with the Book table. In this case, the join between Book and Award will be one-to-many, at the level of detail of awards. This would duplicate measure values for Book and Info. To avoid duplication, you could relate Award and Info to Book instead of joining them inside of the Book logical table.

Supported data model schemas

The data modeling capabilities introduced to Tableau in 2020.2 are designed to make analysis over common multi-table data scenarios—including star and snowflake data models—easy. The following types of models are supported in Tableau data sources.

Single-table

Analysis over a single logical table that contains a mixture of dimensions and measures works just as in Tableau pre-2020.2. You can build a logical table using a combination of
joins, unions, custom SQL, and so on.

Star and snowflake

In enterprise data warehouses, it is common to have data structured in star or snowflake schemas where measures are contained in a central fact table and dimensions are stored separately in independent dimension tables. This organization of data supports many common analysis flows including rollup and drill down.

These models can be directly represented with relationships in the data modeling capabilities available starting with Tableau 2020.2.

Drag the fact table into the model first and then relate the dimension tables to the fact table (in a star schema) or to other dimension tables (in a snowflake).

Typically, in a well-modeled star or snowflake schema, the relationships between the fact table and the dimension tables will be many-to-one. If this information is encoded in your
In a well-modeled star or snowflake schema, every row in the fact table will have a matching entry in each of the dimension tables. If this is true and captured in your data warehouse integrity constraints, Tableau will automatically use this information to set the referential integrity setting in Performance Options. If some fact table rows do not have a matching row in a dimension table (sometimes called “late-arriving dimensions” or “early-arriving facts”), Tableau will default to retaining all rows when computing measures, but may drop values when showing dimension headers. For more information, see Optimize Relationship Queries Using Performance Options.

Star and snowflake with measures in more than one table

In some star or snowflake schemas, all the measures for your analysis are contained in the fact table. However, it is often true that additional measures of interest may be related to the dimension tables in your analysis. Even if the dimension tables do not contain measures, it is common in analysis to want to count or otherwise aggregate dimension values. In these cases, the distinction between fact tables and dimension tables is less clear. To create clarity when viewing your data model, we recommended adding the finest grain table to the data source canvas first, and then relating all other tables to that first table.
Tableau Online Help

If you were to join these tables together into a single logical table, the measures in the dimension tables would be replicated, resulting in distorted aggregates unless you took precautions to deduplicate the values using LOD calculations or COUNT DISTINCT. However, if you instead create relationships between these tables, Tableau will aggregate measures before performing joins, avoiding the problem of unnecessary duplication. This relieves you of the need to carefully track the level of detail of your measures.

Multi-fact analysis

Tableau’s data modeling capabilities support some forms of multi-fact analysis. Additional fact tables (containing measures) can be added to any of the previously mentioned models as long as they only relate to a single dimension table. For example, you can bring two or more fact tables together to analyze a shared dimension, such as in Customer 360-like analyses. These fact tables can be at a different level of detail than the dimension table, or from each other. They can also have a many-to-many relationship with the dimension table. In these scenarios, Tableau will ensure that values are not replicated before aggregation.

If you don’t have a shared dimension table that relates your fact tables, you can sometimes dynamically build one using custom SQL or by using joins or unions of other dimension tables.
Two fact tables can be related directly to each other on a common dimension. This type of analysis works best when one of the fact tables contains a superset of the common dimension.

Unsupported models

- **Multiple fact tables related to multiple shared dimension tables.** In some use cases it is common to have multiple fact tables related to multiple shared dimension tables. For example, you might have two fact tables, Store Sales and Internet Sales, related to two common dimension tables, Date and Customer. Typically, such scenarios would require creating a circular relationship in your data model. Circular relationships are not supported in 2020.2.

  You can approximate this type of model by merging some of the tables in the physical layer. For example, you might be able to union Store Sales and Internet Sales into a single table, which can then be related to Date and Customer. Alternatively, you might be able to cross-join Date and Customer to create a single dimension table which can then be related to Store Sales and Internet Sales.

- **Directly relating 3 or more fact tables on shared dimensions.** While it is possible to build this model in the logical layer, you might see unwanted results, unless you only use dimensions from a single table.

Requirements for relationships in a data model

- When relating tables, the fields that define the relationships must have the same data type. Changing the data type in the Data Source page does not change this requirement. Tableau will still use the data type in the underlying database for queries.
- You can't define relationships based on geographic fields.
- Circular relationships aren't supported in the data model.
- You can't define relationships between published data sources.
Factors that limit the benefits of using related tables

- Dirty data in tables (i.e. tables that weren't created with a well-structured model in mind and contain a mix of measures and dimensions in multiple tables) can make multi-table analysis more complex.
- Using data source filters will limit Tableau's ability to do join culling in the data. Join culling is a term for how Tableau simplifies queries by removing unnecessary joins.
- Tables with a lot of unmatched values across relationships.
- Interrelating multiple fact tables with multiple dimension tables (attempting to model shared or conformed dimensions).

How Relationships Differ from Joins

Relationships are a dynamic, flexible way to combine data from multiple tables for analysis. You don't define join types for relationships, so you won't see a Venn diagram when you create them.

Think of a relationship as a contract between two tables. When you are building a viz with fields from these tables, Tableau brings in data from these tables using that contract to build a query with the appropriate joins.

- **No up-front join type.** You only need to select matching fields to define a relationship (no join types). Tableau first attempts to create the relationship based on existing key constraints and matching field names. You can then check to ensure they are the fields you want to use, or add more field pairs to better define how the tables should be related.
- **Automatic and context-aware.** Relationships defer joins to the time and context of analysis. Tableau automatically selects join types based on the fields being used in the visualization. During analysis, Tableau adjusts join types intelligently and preserves the native level of detail in your data. You can see aggregations at the level of detail of the fields in your viz rather than having to think about the underlying joins. You don't need to use LOD expressions such as FIXED to deduplicate data in related tables.
- **Flexible.** Relationships can be many-to-many and support full outer joins. When you combine tables using relationships, it's like creating a custom, flexible data source for every viz, all in a single data source for the workbook. Because Tableau queries only tables that are needed based on fields and filters in a viz, you can build a data source that can be used for a variety of analytic flows.
For more information, see Relate Your Data and Don’t Be Scared of Relationships.

**Joins are still available as an option for combining your data.** Double-click a logical table to go to the join canvas. For more information, see Where did joins go?

**Watch a video:** For an introduction to using relationships in Tableau, see this 5-minute video.

**Note:** The interface for editing relationships shown in this video might differ slightly from the current release but has the same functionality.

Also see video podcasts on relationships from Action Analytics, such as Why did Tableau Invent Relationships? Click "Video Podcast" in the Library to see more.

For related information about how relationship queries work, see these Tableau blog posts:

- Relationships, part 1: Introducing new data modeling in Tableau
- Relationships, part 2: Tips and tricks
- Relationships, part 3: Asking questions across multiple related tables

**Characteristics of relationships and joins**

Relationships are a dynamic, flexible way to combine data from multiple tables for analysis. We recommend using relationships as your first approach to combining your data because it makes data preparation and analysis easier and more intuitive. **Use joins only when you absolutely need to.**

Here are some advantages to using relationships to combine tables:

- Make your data source easier to define, change, and reuse.
- Make it easier to analyze data across multiple tables at the correct level of detail (LOD).
- Do not require the use of LOD expressions or LOD calculations for analysis at different levels of detail.
- Only query data from tables with fields used in the current viz.
Relationships

- Are displayed as flexible noodles between logical tables
- Require you to select matching fields between two logical tables
- Do not require you to select join types
- Make all row and column data from related tables potentially available in the data source
- Maintain each table’s level of detail in the data source and during analysis
- Create independent domains at multiple levels of detail. Tables aren’t merged together in the data source.
- During analysis, create the appropriate joins automatically, based on the fields in use.
- Do not duplicate aggregate values (when Performance Options are set to Many-to-Many)
- Keep unmatched measure values (when Performance Options are set to Some Records Match)

Joins

Joins are a more static way to combine data. Joins must be defined between physical tables up front, before analysis, and can’t be changed without impacting all sheets using that data source. Joined tables are always merged into a single table. As a result, sometimes joined data is missing unmatched values, or duplicates aggregated values.

- Are displayed with Venn diagram icons between physical tables
- Require you to select join types and join clauses
- Joined physical tables are merged into a single logical table with a fixed combination of data
- May drop unmatched measure values
- May duplicate aggregate values when fields are at different levels of detail
- Support scenarios that require a single table of data, such as extract filters and aggregation

Requirements for using relationships

- When relating tables, the fields that define the relationships must have the same data type. Changing the data type in the Data Source page does not change this requirement. Tableau will still use the data type in the underlying database for queries.
- You can’t define relationships based on geographic fields.
Circular relationships aren’t supported in the data model.
You can't define relationships between published data sources.

Factors that limit the benefits of using related tables

Dirty data in tables (i.e. tables that weren't created with a well-structured model in mind and contain a mix of measures and dimensions in multiple tables) can make multi-table analysis more complex.

Using data source filters will limit Tableau's ability to do join culling in the data. Join culling is a term for how Tableau simplifies queries by removing unnecessary joins.

Tables with a lot of unmatched values across relationships.

Interrelating multiple fact tables with multiple dimension tables (attempting to model shared or conformed dimensions).

Where did joins go?

You can still specify joins between tables in the physical layer of a data source. Double-click a logical table to go to the Join/Union canvas in the physical layer and add joins or unions.

Every top-level, logical table contains at least one physical table. Open a logical table to view, edit, or create joins between its physical tables. Right-click a logical table, and then click Open. Or, just double-click the table to open it.
When you create a data source, it has two layers. The top-level layer is the logical layer of the data source. You combine data between tables in the logical layer using relationships.

The next layer is the physical layer of the data source. You combine data between tables at the physical layer using joins. For more information, see Logical and physical tables in the data model.
Optimize Relationship Queries Using Performance Options

Performance Options are optional settings that define the cardinality (uniqueness) and referential integrity (matching records) between the two tables in a relationship. These settings help Tableau optimize queries during analysis.

- **If you aren’t sure what to choose**, use the recommended default settings indicated by Tableau. Using the defaults is safe and will automatically generate correct aggregations and joins during analysis. If you don’t know the cardinality or referential integrity, you don’t need to change these settings.

- **If you know the shape of your data**, you can optionally change these settings to represent uniqueness and matching between the records in the two tables.

In many analytical scenarios, using the default settings for a relationship will give you all of the data you need for analysis. In some scenarios, you might want to adjust the Performance Options settings to describe your data more accurately. For more details about using relationships to combine and analyze data, see Relate Your Data and this Tableau blog post: Relationships, part 1: Introducing new data modeling in Tableau.
What the Cardinality and Referential Integrity settings mean

Cardinality options

Cardinality settings determine if Tableau aggregates table data before or after automatically joining the data during analysis.

- Select **Many** if the field values aren’t unique, or you don’t know. Tableau will aggregate the relevant data before forming joins during analysis.
- Select **One** if field values are unique. During analysis, the relevant data will be joined before aggregation. Setting this option correctly optimizes queries in the workbook when the field values in the relationship are unique. However, selecting **One** when field values aren’t unique can result in duplicate aggregate values being shown in the view.

**Note**: Selecting **One** treats records as if each key value is unique and there is at most only one row with a null value.

Referential Integrity options

Referential Integrity settings determine the type of join used to get the dimension values for a measure during analysis.
- Select **Some Records Match** if some values in the field don’t have a match in the other table, or you don’t know. During analysis, Tableau uses outer joins to get dimensions values for a measure. All measure values will be shown in the view, even unmatched measures.
- Select **All Records Match** if values in the field are guaranteed to have a match in the other table. This setting generates fewer and simpler joins during analysis, and optimizes queries. You might see inconsistent results during analysis (unmatched values removed or missing in view) if there are unmatched values in this table.

**Notes:** Selecting **All Records Match** treats records as if no null values exist in the fields used for the relationship. During analysis, Tableau will use inner joins to get dimension values for a measure. By default, Tableau will never join null keys.

For more information about Cardinality and Referential integrity as concepts, see [Cardinality and Referential Integrity](#).

**Where did joins go?**

You can still specify joins between tables in the physical layer of a data source. Double-click a logical table to go to the join canvas.

Every top-level, logical table contains at least one physical table. Open a logical table to view, edit, or create joins between its physical tables. Right-click a logical table, and then click **Open**. Or, just double-click the table to open it.
When you create a data source, it has two layers. The top-level layer is the logical layer of the data source. You combine data between tables in the logical layer using relationships.

The next layer is the physical layer of the data source. You combine data between tables at the physical layer using joins. For more information, see Logical and physical tables in the data model.
Tips on using Performance Options

If you know the shape of your data, you can use the optional settings in Performance Options to establish the cardinality of the tables to each other (one-to-one, one-to-many, many-to-many) and indicate referential integrity (values from one table will always have match in the other table).

Instead of thinking of the settings in Performance Options as “yes” and “no”, think of them as “yes” and “I don’t know”. If you are sure that a table’s values are unique, select One. If you are sure that each record in one table matches one or more records in the other table, select All Records Match. Otherwise, leave the default settings as they are.

If you aren’t sure about the shape of your data, use the default settings. When Tableau can’t detect these settings in your data, the default settings are:

- Cardinality: Many-to-Many
- Referential integrity: Some Records Match

If Tableau detects key relationships or referential integrity in your data, those settings will be used and indicated as "detected".

To reapply the default settings, click Revert to Default.
Terms defined

*Cardinality* refers to the uniqueness of data contained in a field (column) or combination of fields. When the tables you want to analyze contain many rows of data, queries can be slow (and performance of the overall data source is affected) so we recommend choosing a method for combining data based on the cardinality of the related columns between tables.

- **Low cardinality**: When related columns have a lot of repeated data. For example, a table called Products might contain a Category column that contains three values: Furniture, Office Supplies, and Technology.
- **High cardinality**: When related columns have highly unique data. For example, a table called Orders might contain an Order ID column that contains a unique value for every order of product.

*Referential integrity* means that one table will always have a matching row in the other table. For example, a Sales table will always have a matching row in the Product Catalog table.

Automatically Build Views with Ask Data

Ask Data lets you type a question in common language and instantly get a response right in Tableau. Answers come in the form of automatic data visualizations, with no need to manually drag-and-drop fields or understand the nuances of your data’s structure.

Ask Data lets you ask sophisticated questions naturally, with support for key analytical concepts like time series and spatial analysis, and an understanding of conversational phrases like “last year”, “earliest”, and “most popular”.
Navigating to Ask Data lenses

Before you can query a data source with Ask Data, a Tableau author must first create a lens that specifies the subset of data fields the lens uses.

In Tableau, here are all the places where you can access an Ask Data lens:

**Recommended Visualizations**

Pin visualizations you recommend to this starting page. First go to a visualization, then click the pin icon in the toolbar to add or replace a recommendation.

- Basic Data Analysis
- Date and Time
- Filters
- Viz Type
- On the All Lenses page at the top level of your Tableau Online or Tableau Server site.

- On the Ask Data tab for a data source for which lenses have been created.
In an Ask Data object on a dashboard.

Ask Data from a lens page or dashboard object

Navigate to a lens and learn more about its data

1. Navigate to a lens via the All Lenses page for your Tableau site, the Ask Data tab for a data source, or an Ask Data object on a dashboard.

2. (Optional) Under **Recommended Visualizations**, click an entry to quickly see visualizations the lens author has created for your organization.

   If the recommendations don't address your current data analysis needs, **build a query** to create your own question.

3. In the Data pane at left, briefly hover over each field to learn more about the data it contains.
In a narrower dashboard object, the Data pane may be hidden, but you can see the same information by clicking the **Fields** drop-down menu.
Build queries visually

1. Click **Add Field** or **Add Filter**.

2. Click the desired field. (To narrow down a long list, first type in the **Search Fields** box.)

3. Set any sub-options, such as aggregation type for a numeric field, or grouping for string and date fields.
4. To add more fields or filters, click the plus sign.

Build queries by entering text

1. Type in the box reading “Search fields or values to create a visualization”.

2. As you type, Ask Data searches data fields, functions, and string values and displays results in a drop-down list. Click items in the list to add them to your current entry, shown above the search box. To automatically create a viz using the current entry, press **Enter** at any time.
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Modifying a query by searching for fields and analytical functions

A. Current entry B. Current filters C. Search box D. Returned fields E. Returned analytical functions F. Returned field values

**See how elements of your query are applied**

To see how elements of your query are applied, hover over them in the text box or the interpretation above it. Words that aren’t used are grayed out, helping you rephrase your query.
in a way that’s clearer to Ask Data.

Rephrase your question
You can rephrase questions by clicking options, data fields, and filters in the user interface.

Change the viz type
If the default viz doesn’t fully reveal your data, click the menu at upper right, and choose from these supported viz types:

- Bar Chart
- Gantt Bar
- Heat Map
- Histogram
- Line Chart
- Map
- Pie Chart
- Scatter
- Stacked Bar Chart
- Text Table
- Treemap
Note: To automatically create certain viz types, Ask Data sometimes adds fields like “Number of Records” to your entries.

Change fields, filters, and displayed data

Ask Data gives you several ways to fine-tune how field values are displayed.

- To switch the fields used for the vertical and horizontal axes, click the Swap Axes button to the left of the viz selection menu:

- To change a field, first click it in your query entry, and then click the field name below. (To change fields used in difference calculations, see Compare differences over time.)
To change a field's aggregation or grouping type (for example, from average to sum), click the field name in the text box, and then choose a different aggregation or grouping.

For categorical filters, click values (like "exclude United States" in the example below) to change specific values or enter wildcard parameters.
To adjust a numeric range, click words like “high”, “between”, or “cheap”.

To delete a field or filter, hover over it and click the X.

Adjust date filters

To adjust a date filter, click words like “in”, “last”, “previous”, or “between”. Then click one of the following:

- **Specific Dates** to enter a specific time period or date value
- **Relative Dates** to show a date range relative to the present day
Tableau Online Help

- **Range of Dates** to enter specific start and end points

**Specific Dates** offers some unique options in the **Date Detail** menu:

- **Time Period** options show a single continuous date range
- **Date Value** options show ranges that can repeat in multiple time periods. For example, to see combined sales performance for Q1 across multiple years, under Date Value, you would choose Quarters.
Tableau Online Help
Compare differences over time

Ask Data lets you compare time periods with phrases like “year over year”, “quarter over quarter”, or similar comparisons by month, week, or day. The results appear as difference or percent difference table calculations in workbooks you save from Ask Data.

In the text box, click a difference calculation to choose other fields, aggregation methods, and time periods.

Tableau Online Help
Apply simple calculations

Ask Data supports simple calculations between two measures, which you can apply using these symbols:

+ sums the measures

- produces the difference between them

* multiplies

/ divides

In workbooks you save from Ask Data, these calculations don't become calculated fields but instead ad hoc calculations on the Columns, Rows, or Marks shelves.
Add sheets with other vizzes

To quickly create multiple different vizzes from a lens, add sheets in Ask Data.

At the bottom of the web page, do any of the following:

- Click the **Add Sheet** icon to the right of named sheets.

- Right-click a sheet name, and choose either **Duplicate** or **Delete**.

  (To rename sheets from Ask Data, you need to save them in a new workbook.)

Share Ask Data vizzes via email, Slack, or a link

You can quickly share Ask Data vizzes with anyone who has access to a lens.
1. In the upper right corner of the browser, click the Share icon.

![Share icon]

2. Do either of the following:
   - To share the viz via email or Slack, enter specific user names in the text box. (Email and Slack integration must previously be configured by your Tableau administrator.)
   - To copy a URL you can paste into custom emails and other messages, click Copy Link.

**Send feedback to the lens owner**

If you have questions about the structure of a lens or how best to use it with Ask Data, you can send feedback directly to the author. (This option is enabled by default, but lens authors may disable it.)

1. To the left of the query box for Ask Data, click the "Ask Data tips" icon.

![Ask Data tips]

2. At the bottom of the tips dialog, click **Contact the Lens Author**.

**Tips for successful queries**

As you structure questions for Ask Data, apply these tips to get better results.
Use keywords — For example, instead of “I want to see all the countries that these airports are in”, try “by airport and country”.

Use exact wording for field names and values — For example, if your lens includes Airport Code, Airport Name, and Airport Region fields, specify those by name.

See a ranked list — Ask Data maps terms like “best” and “worst” to Top 1 and Bottom 1, respectively. If you want to see broader rankings, use “high” and “low” instead. For example, enter “houses with low sale prices”.

Query table calculations — In query expressions for table calculation fields, note that you can’t filter, limit, or include “year over year difference”.

Surround unusually long values with quotation marks — To analyze long field values that contain line returns, tabs, or more than ten words, surround them with quotation marks. To improve performance, Ask Data doesn’t index fields of that length, or anything beyond the first 200,000 unique field values.

Create Lenses that Focus Ask Data for Specific Audiences

Most people don’t need information from an entire data source but instead want data visualizations relevant to their job function, like sales, marketing, or support. To optimize Ask Data for different audiences like these, Tableau authors create separate Ask Data lenses, which query a selected subset of fields. For the selected fields, authors can specify synonyms for field names and values, reflecting terms the lens audience uses in common language (for example, “SF” for “San Francisco”). Lens authors then customize the recommended visualizations that appear below the Ask Data query box, which provide answers to users with a single click.

**Note:** Ask Data lenses can be created only for data sources published separately to a Tableau site. Lenses can’t be created for data sources embedded in workbooks or those with a virtual connection.
Create or configure a lens page on your Tableau site

On your Tableau site, each lens has a separate page where users can query Ask Data and authors can configure lens fields, synonyms, and suggested questions.

A lens page on a Tableau site

1. To create a lens page on your Tableau site, go to a data source page, and choose **New > Ask Data Lens**.

   To configure an existing lens, go to the lens page on your site. (From an Ask Data object in a dashboard, you can click the pop-up menu in the upper corner and choose **Go to Lens Page**.)

2. If you're creating a new lens, enter a name, description, and project location, and then click **Publish Lens**.
3. At the top of the Fields pane at left, click the pencil icon. Then select the relevant fields for lens users, and click **Save**.

4. At left, hover over individual tables or fields, and click the pencil icon:

   Then do any of the following:
• Provide a more representative name by clicking the pencil icon to the right.

• Add common synonyms for field names and values that lens users may enter in their queries.

• Edit descriptions that appear when users hover over fields.

Change the list of recommended visualizations

To address common queries from lens users, you can customize the recommended visualizations that appear below the query box.

Add or replace a recommended visualization

1. Enter a query into the text box, and press Enter or Return.
2. After the visualization appears, from the pin icon in the toolbar, choose either Pin to Recommended Visualizations or Replace Recommendation.

3. For a new recommendation, enter a name, and choose the section in which you want it to appear. For a replacement recommendation, choose the existing one you want to overwrite.

Edit section titles and recommendation names, or delete recommendations

• To edit a section title, click the pencil icon to the right of the title.

• To change the name of a recommendation, hover over it and click the pencil icon.
To delete a recommendation, click the X.

Add an Ask Data lens to a dashboard

On a dashboard, you can add an Ask Data object that lets users query a published data source via a lens on your Tableau site.

1. While editing a dashboard in Tableau Online or Tableau Server, drag the Ask Data object to the canvas.

**Note:** In Tableau Desktop, you can also drag an Ask Data object to the canvas for placement purposes. But to select a lens, you will need publish to Tableau Online or Tableau Server and edit the object there.
3. Select a published data source previously connected to the workbook.

4. To use an existing lens, select it, and click **Use Lens**.

   Or, to create a new lens, do one of the following:

   - If there are no lenses for the data source, click **Go to Data Source Page**.
   - If lenses already exist, click the data source name at the bottom of the dialog.

5. (New lenses only) Complete the steps in Create or configure a lens page on your Tableau site.

6. Under **Toolbar Options for Lens Users**, select the buttons you want available to users.

   - **Add Visualization to Pins** lets users add to the Recommended Visualizations list, which appears just below the query box.
   - **Publish as Workbook** lets users save visualizations as workbook sheets to their Tableau site.
   - **Share Visualization** lets users share via email, Slack, or a link.

   In the lens, the publish (save icon), pin, and share options appear in the upper right corner:
7. (New lenses only) After you finish creating the lens, return to the Lens object in your dashboard, and click **Refresh**. Then select the new lens, and click **Use Lens**.

### Apply a different lens to an Ask Data dashboard object

1. From the pop-up menu at the top of the object, choose **Configure**.

2. Go to Add an Ask Data lens to a dashboard, and repeat steps 2 onward.

### Change a lens name, description, or project location

1. Navigate to the lens page on Tableau Online or Tableau Server.
2. To the right of the lens name at the top of the page, click the three dots (...), and choose **Edit Workbook**.
3. Click **Edit Lens Details**.
See how people use Ask Data with a lens

For data source owners and lens authors, Ask Data provides a dashboard that reveals the most popular queries and fields, the number of visualization results that users clicked, and other helpful information. Filters let you narrow data down to specific users and time ranges. These stats help you further optimize a lens to increase the success of your users.

**Note:** If you use Tableau Server, you can access this data in the Tableau Server Repository to create custom dashboards.

1. In Tableau Server or Tableau Online, navigate to a lens page.
2. To the left of the Ask Data text box, click the "Ask Data tips" icon.

3. In the lower-left corner of the tips dialog, click **Usage Analytics**.

Let users email you questions about a lens

As a lens owner, you can allow users to email you with questions about data structure, expected results, and more. This option is on by default, but you can turn it off using the steps below.

1. In Tableau Server or Tableau Online, navigate to a lens page.
2. To the left of the Ask Data text box, click the "i" shown above in See how people use Ask Data with a lens.
3. At the bottom of the tips dialog, click the eye icon next to "Contact the Lens Author" to
enable or disable feedback.

Permissions for publishing and viewing lenses

For Ask Data objects in dashboards, no change to permissions should be required: by default, existing workbook authors can create lenses, and existing dashboard audiences can
view them. But for reference, here’s a detailed outline of required lens permissions for both dashboards and direct access via a data source page.

To create and publish a lens, a user needs:

- The Creator or Explorer user role
- Lens Creation permission for the data source (inherited by default from the Connect permission)
- Write permission for the parent project to which the lens is published

To access and interact with a published lens, a user needs:

- The Viewer role or above
- Connect permission for the data source
- View permission for the lens

**Note:** By default, lens permissions like View reflect a project’s permissions for workbooks. If Tableau administrators want to change default lens permissions, they can do so either individually for each project, or in bulk using the permissions API.

## Disable or Enable Ask Data for a Site

Ask Data is enabled for sites by default, but Tableau administrators may disable it.

1. Go to the **General** site settings.

2. (Tableau Server only) In the **Web Authoring** section, select **Let users edit workbooks in their browser**.

3. In the **Availability of Ask Data** section, choose from these options:

   - **Enabled** enables creation of Ask Data lenses for all published data sources.
   - **Disabled** hides Ask Data throughout the site, while preserving information about previously created lenses so they can be restored if Ask Data is re-enabled.
Optimize Data for Ask Data

If you manage and publish data sources, here are some tips to help make users of Ask Data more successful. By spending a little extra time on this process, you'll open up data analysis to a wider range of people at your organization, helping them independently answer questions and gain deeper insights.

Optimize data in Ask Data

In the Data pane on the left of the Ask Data interface, data source owners can add synonyms for fields and exclude irrelevant values.

Changing settings at the data source or lens level

When changing settings in the Data pane for Ask Data, pay close attention to whether you're at the data source or lens level. (For more information, see Create Lenses that Focus Ask Data for Specific Audiences.)

- At the data source level, you'll see the cylindrical data source icon in the upper left corner. Here, changes you make in the Data pane will apply by default to all subsequently created lenses.

Note: For extracts, two cylinders will appear.
For an individual lens, you'll see the quotation icon in the upper left corner. Here, changes you make in the Data pane will apply to this lens alone.
Add synonyms for field names and values

People may not use the same terminology found in your data source, so data source owners and Tableau administrators can add synonyms for specific data field names and values. Synonyms you enter are available throughout your organization, making data analysis quicker and easier for everyone.

Exclude values of specific fields from search results

To improve the usability of search results in Ask Data, you can exclude the values of specific fields from indexing. Though Ask Data doesn't add non-indexed values to search results, the values still appear in visualization results when relevant. For example, if you don't index values from a "Product" field because they add unnecessary detail to search results, Ask Data can still display values such as "iPhone 12" in resulting data visualizations. And users can manually add non-indexed values to queries by surrounding them with quotation marks (for example, "Sales for Product containing "iPhone 12"").

Note: This field-level setting is ignored if the value indexing setting for the data source is set to Disabled. Field names and related synonyms are always indexed.

1. Go to the Ask Data tab for a data source or individual lens.
2. Hover over a data source field at left, and click the Edit Field Details icon (the pencil).
3. Deselect Index field values.

   Either click the text box that appears to reindex the data source now, or let it reindex based on its regular indexing schedule.
Optimize data sources

To create the best experience for Ask Data users, optimize the original data source.

**Note:** Ask Data doesn’t support multidimensional cube data sources, or non-relational data sources like Google Analytics, or data sources with a virtual connection.

Optimize indexing for Ask Data

Data source owners can change how often field values are indexed for Ask Data, optimizing system performance.

1. At the top of a data source page, click the Details icon:

   ![World Indicators data source](image)

2. In the Ask Data section, click **Edit**.

3. Choose an indexing option for field values:

   - **Automatic** checks for changes every 24 hours and analyzes the data source if it is live, has had an extract refreshed, or has been republished. Choose this option for a data source frequently used with Ask Data, so it will be ready before users query it.

   - **Manual** analyzes the data source only when Tableau creators manually trigger indexing on the data source page. Choose this option if the data source changes frequently but users query it with Ask Data only occasionally.
To trigger manual indexing, go to the data source page, click the circled “i” in the Data pane at left, and then click Reindex Data Source.

- **Disabled** analyzes only field names, not values.

4. Click **Save**

Use data extracts for faster performance

For improved performance and support for large data sets, use Ask Data with published extracts rather than live data sources. For more information, see Create an extract.

Ensure that users can access the data source

To use Ask Data, users must have permission to connect to the individual data source. If a data source has row-level permissions, those permissions also apply to Ask Data, which won’t recognize secure values or make related statistical recommendations.

Be aware of unsupported data source features

Ask Data supports all Tableau data source features except the following. If your data source contains these, Ask Data users won’t be able to query related fields.

- Sets
  - Combined fields
  - Parameters
Anticipate user questions

Anticipate the kinds of questions your users will ask, and then optimize your data source for those questions using these techniques:

- Clean and shape data in Tableau Prep or a similar tool.
- Join data to include all fields users may have questions about in one table, improving performance.
- Add calculated fields that answer common user questions.
- Create bins with appropriate sizes for quantitative variables that users are likely to want to see as a histogram or another binned form.

Simplify the data

To make data easier to understand by both users and Ask Data, simplify the data source as much as possible during the data prep process.

1. Remove any unnecessary fields to improve performance.
2. Give each field a unique and meaningful name.
   - For example, if there are five field names that start with “Sales …”, better distinguish them so Ask Data can properly interpret the term “sales”.
   - Rename “Number of records” to something more meaningful. For example, use “Number of earthquakes” in a data source where each record is an earthquake.
   - Avoid field names that are numbers, dates, or boolean (“true” or “false”) values.
   - Avoid names which resemble analytical expressions such as “Sales in 2015” or “Average Products Sold”.
3. Create meaningful aliases for field values, reflecting terms people would use in conversation.

Set appropriate field defaults

To help Ask Data analyze data correctly, ensure that default field settings reflect the content of each field.

- Set data types for text, time, date, geographic, and other values.
- Assign the proper data role: dimension or measure, continuous or discrete.
For each measure, assign appropriate default settings in Tableau Desktop, such as color, sort order, number format (percentage, currency, etc.), and aggregation function. For example, SUM may be appropriate for “Sales”, but AVERAGE might be a better default for “Test Score”.

**Tip:** It's particularly helpful to set a default comment for each field, because these comments appear as informative descriptions when users hover over fields in Ask Data.

Create hierarchies for geographic and categorical fields

For time data, Tableau automatically creates hierarchies, which let users quickly drill up and down in vizzes (for example, from day to week to month). For geographic and categorical data, however, we recommend that you create custom hierarchies to help Ask Data produce visualizations that reflect the relationships between fields. Be aware that Ask Data won't show the hierarchies in the data pane.

Ask Data doesn't index hierarchy names, only names of fields within hierarchies. For example, if a geographic hierarchy named “Location” contains “Country” and “City” fields, users should enter “Country” and “City” in their questions for Ask Data.

**Discover Insights Faster with Explain Data**

Explain Data gives you a new window into your data. Use it to inspect, uncover, and dig deeper into the marks in a viz as you build, explore, and analyze your data. When you select a mark while editing a view and run Explain Data, Tableau builds statistical models and proposes possible explanations for the selected mark, including potentially related data from the data source that isn’t used in the current view.

For information on running Explain Data and exploring explanations, see Get Started with Explain Data.
Note: This topic describes how Explain Data works in Tableau 2021.2 and later versions. If you have a previous version of Tableau, read this topic in version 2021.1 of Explain Data help.

Select a mark and run Explain Data from the tooltip menu. The Explain Data pane opens with possible explanations.

As you build different views, use Explain Data as a jumping-off point to help you explore your data more deeply and ask better questions. For more information, see How Explain Data helps to augment your analysis. For information on what characteristics make a data source more interesting for use with Explain Data, see Requirements and Considerations for Using Explain Data.
Access to Explain Data

Explain Data is enabled by default at the site level. Server administrators (Tableau Server) and site administrators (Tableau Online) can control whether Explain Data is available for a site. For more information, Disable or Enable Explain Data for a Site.

Authors who can edit workbooks and have the Run Explain Data permission capability for a workbook can run Explain Data in editing mode.

Authors can use Explain Data Settings to control whether Explain Data is available in viewing mode in published workbooks and which explanation types are displayed in the Explain Data pane.

When Explain Data is enabled by the author of a published workbook, all users with the Run Explain Data capability can run Explain Data on a mark in viewing mode.

For information on controlling access to Explain Data, explanation types, and fields, see Control Access to Explain Data.

How Explain Data helps to augment your analysis

Explain Data is a tool that uncovers and describes relationships in your data. It can't tell you what is causing the relationships or how to interpret the data. You are the expert on your data. Your domain knowledge and intuition are key in helping you decide what characteristics might be interesting to explore further using different views. For related information, see How Explain Data Works and Requirements and Considerations for Using Explain Data.

For more information on how Explain Data works and how to use Explain Data to augment your analysis, see these Tableau Conference presentations:

- From Analyst to Statistician: Explain Data in Practice (1 hour)
- Leveraging Explain Data (45 minutes)
- Explain Data Internals: Automated Bayesian Modeling (35 minutes)
Get Started with Explain Data

Use Explain Data in your flow of analysis as you are exploring the marks in a viz. The best way to get started with Explain Data is to select a mark, run Explain Data, and start exploring explanations.

Use Explain Data

- Run Explain Data on a mark
- Drill into explanations
- View analyzed fields
- Why am I seeing a Reselect button?
- Terms and concepts in explanations
- Explanation Types

Author Workbooks and Control Access

- Requirements and Considerations for Using Explain Data
- Change Explain Data Settings (Authors-only)
- Control Access to Explain Data
- Disable or Enable Explain Data for a Site
- How Explain Data Works

Run Explain Data on a mark

The basic steps to run Explain Data are:

1. Select a mark in a viz.
2. Hover the cursor over the mark, and then click Explain Data in the tooltip menu.

The Explain Data pane opens with possible explanations for the value of the analyzed mark. Click different explanation names to expand the details and start exploring.
Tips for using Explain Data

- You must select a single mark—only one mark can be explained at a time.
- The view must contain marks that are aggregated using SUM, AVG, COUNT, COUNTD, or AGG (a calculated field).
- If Explain Data cannot analyze the type of mark selected, the Explain Data icon and context menu command will not be available. For more information, see Situations where Explain Data is not available.
- The data you analyze must be drawn from a single, primary data source. Explain Data does not work with blended or cube data sources.
- For information on what characteristics make a data source more interesting for use with Explain Data, see Requirements and Considerations for Using Explain Data.

Drill into explanations

1. In the Explain Data pane, click an explanation name to see more details.

   Click the arrows to expand or contract explanations.
2. Scroll to see explanation details.
Some explanations offer different layers of details for further exploration

3. Hover over charts in the explanations to see more detail. Click the **Open** icon to see a larger version of the visualization.
Creators or Explorers who open the view for editing can click the Open icon to open the visualization as a new worksheet and explore the data further.

**Note:** Creators and Explorers who have editing permissions can also control Explain Data Settings. For more information, see Control Access to Explain Data.

4. Hover over a Help icon to see tooltip help for an explanation. Click the Help icon to keep the tooltip open. Click a Learn More link to open the related help topic.
Why am I seeing a Reselect button?

When you run Explain Data, the explanations that are presented in the Explain Data pane specifically apply to the mark you selected. If you click a different mark, deselect the analyzed mark, or navigate to a different sheet in the workbook, a Reselect button appears in the view thumbnail image at the top of the Explain Data pane.

If you click Reselect, Tableau returns you to the original view and worksheet, and reselects the analyzed mark. Click Update to run Explain Data again.

To explore a new mark, click another mark, and then click Run in the Explain Data pane.
Explain Data might also display messages to indicate the view has changed (such new fields or filters added or removed from the view), if the data source has changed, or if Explain Data settings have changed.

View analyzed fields

1. Run Explain Data on a mark.
2. In the Explain Data pane, under **Explore underlying values for**, click a target measure name.
3. Click the *number-of-fields* link at the bottom of the pane.

Authors have the option to open Explain Data Settings to control which fields are included in the analysis. For more information, see [Change fields used for statistical analysis](#).

**Terms and concepts in explanations**

The following terms and concepts appear frequently in explanations. You may find it helpful to become acquainted with their meaning in the context of using Explain Data.

**What is a mark?**

A mark is a selectable data point that summarizes some underlying record values in your data. A mark can be made of a single record or multiple records aggregated together. Marks
in Tableau can be displayed in many different ways such as lines, shapes, bars, and cell text.

Tableau gets the records that make up the mark based on the intersection of the fields in the view.

The **analyzed mark** refers to a mark that you selected in the view that was analyzed by Explain Data.

For more information on marks, see **Marks**.

**What does expected mean?**

The expected value for a mark is the median value in the expected range of values in the underlying data in your viz. The expected range is the range of values between the 15th and 85th percentile that the statistical model predicts for the analyzed mark. Tableau determines the expected range each time it runs a statistical analysis on a selected mark.

If an expected value summary says the mark is *lower than expected* or *higher than expected*, it means the aggregated mark value is outside the range of values that a statistical model is predicting for the mark. If an expected value summary says the mark is *slightly lower* or *slightly higher* than expected or *within the range of natural variation*, it means the aggregated mark value is within the range of predicted mark values, but is lower or higher than the median.

For more information, see **What is an expected range?**

**What are dimensions and measures?**

Each column name in a database is a field. For example, Product Name and Sales are each fields. In Tableau, fields like Product Name that categorize data are called dimensions; fields with quantifiable data like Sales are called measures. Tableau aggregates measures
by default when you drag them into a view. Some explanations describe how the underlying record values and the aggregations of those values may be contributing to the value of the analyzed mark. Other explanations may mention the distribution of values across a dimension for the analyzed mark.

When you run Explain Data on mark, the analysis considers dimensions and measures in the data source that aren’t represented in the view. These fields are referred to as unvisualized dimensions and unvisualized measures.

For more information on dimensions and measures, see Dimensions and Measures.

What is an aggregate or aggregation?

An aggregate is a value that is a summary or total. Tableau automatically applies aggregations such as SUM or AVG whenever you drag a measure onto Rows, Columns, a Marks card option, or the view. For example, measures are displayed as SUM(Sales) or AVG (Sales) to indicate how the measure is being aggregated.

To use Explain Data, your visualization must use a measure that is aggregated with SUM, AVG, COUNT, COUNTD, or AGG.

For more information about aggregation, see Data Aggregation in Tableau.

What is a record value?

A record is a row in a database table. A row contains values that correspond to each field. In this example, Category, Product Name, and Sales are fields (or columns). Furniture, Floor Lamp, and $96 are the values.

<table>
<thead>
<tr>
<th>Category</th>
<th>Product Name</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture</td>
<td>Floor Lamp</td>
<td>$96.00</td>
</tr>
</tbody>
</table>

What is a distribution?
A distribution is a list of all the possible values (or intervals) of the data. It also indicates how often each value occurs (frequency of occurrence).

**Explanation Types in Explain Data**

Each time you select a new mark in a viz or dashboard and run Explain Data, Tableau runs a new statistical analysis considering that mark and the underlying data in the workbook. Possible explanations are displayed in expandable sections for the Explain Data pane. For information about how Explain Data analyzes and evaluates explanations, see How Explain Data Works.

**Explore underlying values**

This section of the Explain Data pane lists explanations for each measure that can be explained (referred to as target measures). Each explanation listed here describes a relationship with the values of the target measure that are tested on the analyzed mark. Use your real-world, practical understanding of the data to determine if the relationships found by Explain Data are meaningful and worth exploring.
In this example, Trip Distance is the target measure

Underlying Characteristics

These explanations describe how underlying records of the marks in the view may be contributing to the aggregated value of the measure being explained. Mark attributes can include Extreme Values, Null Values, Number of Records, or the Average Value of the mark.

*Note:* For definitions of common terms used in explanations, see Terms and concepts in explanations.

**Extreme Values**

This explanation type indicates if one or more records have values that are significantly higher or lower than most records. If the explanation is supported by a model, it indicates the
extreme value is affecting the target measure of the analyzed mark.

When a mark has extreme values, it doesn’t automatically mean it has outliers or that you should exclude those records from the view. That choice is up to you depending on your analysis. The explanation is simply pointing out an extreme value in the mark. For example, it could reveal a mistyped value in a record where a banana cost 10 dollars instead of 10 cents. Or, it could reveal that a particular sales person had a great quarter.

**Note:** This explanation must be enabled by the author to be visible in viewing mode for a published workbook. For more information, see Control Access to Explain Data.

**This explanation shows:**

- The number of underlying records in the analyzed mark.
- The extreme value or values contributing to the value of the target measure.
- The distribution of values in the mark.
- The record details that correspond to each distribution value.

**Exploration options:**

- Hover over a circle in the chart to see its corresponding value.
- Click the left or right arrow below the details list to scroll through record details.
- If available, click **View Full Data**, and then click the **Full Data** tab to see all records in a table.
- Click the **Open** icon to see a larger version of the visualization.

In this example, a single extreme value of 463 hours rented is contributing to the higher than expected sum of Total Time Rented of 613 hours.
Next steps for analysis:

- If the number of records is low, examine these values compared to the extreme value.
- If the extreme value is significantly higher or lower than the other record values, exclude it and consider how it changes the value of the analyzed mark.
- When considering the data with and without the extreme value, use this as an opportunity to apply your practical knowledge about the data.

A likely reason for this high value could be that someone forgot to dock the bike when they returned it. In this case, the author might want to exclude this value for future analysis.

Visualize the Difference

This section shows:

- How the analyzed mark value changes when the extreme value is excluded.
Exploration options:

- Click the Open icon to see a larger version of the visualization.
- Explore the difference with and without the extreme value (or values).
- Authors can open the view as a new sheet and apply a filter to exclude the extreme value.

Next steps for analysis:

- If the extreme value is significantly higher or lower than the other record values, exclude it and see how it changes the value of the analyzed mark.
- When considering the data with and without the extreme value, use this as an opportunity to apply your practical knowledge about the data.

In this example, when the extreme value of 483 is excluded, the analyzed mark is no longer high compared to other marks in the view. Other marks now stand out. The author might want to explore the other marks to consider why these other locations have higher hours for bike rentals.

Null Values

The Null Values explanation type calls out situations where there is a higher than expected amount of missing data in a mark. It indicates the fraction of target measure values that are null and how the null values might be contributing to the aggregate value of that measure.

This explanation shows:

- The percent of values that are null in the target measure for the analyzed mark (blue circle).

Exploration options:
Tableau Online Help

- Hover over each circle in the scatter plot to see its details.
- Scroll to see more of the chart.
- Click the Open icon to see a larger version of the visualization.

In this example, the percent of null values in the target measure is shown as a blue circle.

**Next steps for analysis:**

- Optionally exclude null values in the mark for further analysis.

**Number of Records**

This explanation type describes when the count of the underlying records is correlated to the sum. The analysis found a relationship between the number of records that are being aggregated in a mark and the mark's actual value.

While this might seem obvious, this explanation type helps you explore whether the mark's value is being affected by the magnitude of the values in its records or simply because of the number of records in the analyzed mark.
This explanation shows:

- The number of records in the target measure for the analyzed mark (dark blue bar).
- The number of records in the target measure for other marks in the source visualization (light blue bar).

Exploration options:

- Hover over each bar to see its details.
- Scroll to see more of the chart.
- Click the Open icon to see a larger version of the visualization.

Next steps for analysis:

- Compare whether the individual values of records are low or high, or the number of records in the analyzed mark is low or high.
- Authors, if you are surprised by a high number of records, you might need to normalize the data.

In this example, the number of records for Trip Distance is listed for each value of Ride Month, which is a dimension in the original visualization. August has the highest total trip distance value.

You might explore whether August has the highest value for trip distance because more rides occurred in August, or if it has the highest trip distance because some rides were longer.
This explanation type describes when the average of a measure is correlated to the sum. Compare whether the average value is low or high, or the number of records is low or high.

**This explanation shows:**
- The average of the target measure for each value of a dimension used in the source visualization.

**Exploration options:**
- Hover over each bar to see its details.
- Scroll to see more of the chart.
- Click the Open icon to see a larger version of the visualization.

**Next steps for analysis:**
- Compare whether the average value is low or high, or the number of records is low or high. For example, are profits high because you sold a lot of items or because you sold expensive items?
- Try to figure out why the analyzed mark has a significantly higher or lower average value.

In this example, the average trip distance for August is not significantly higher or lower than most months. This suggests that trip distance is higher for August because there were more rides in August, rather than from people taking longer rides.
Contributing Single Value

Use this explanation to understand the composition of the record values that make up the analyzed mark.

This explanation type identifies when a single value in an unvisualized dimension may be contributing to the aggregate value of the analyzed mark. An unvisualized dimension is a dimension that exists in the data source, but isn't currently being used in the view.

This explanation indicates when every underlying record of a dimension has the same value, or when a dimension value stands out because either many or few of the records have the same single value for the analyzed mark.

**Note:** For definitions of common terms used in explanations, see Terms and concepts in explanations.
This explanation shows:

- The percent of the number of records for a single value of a dimension for the analyzed mark (blue bar) versus all marks (gray bar) in the source visualization.
- The percent of the number of records for all other values of a dimension for the analyzed mark (blue bar) versus all marks (gray bar) in the source visualization.
- The average of the target measure for the single value of a dimension in the analyzed mark (blue bar) versus all marks (gray bar).
- The average of the target measure for all other values of a dimension for the analyzed mark (blue bar) versus all marks (gray bar) in the source visualization.

Exploration options:

- Hover over each bar to see its details.
- Click the Open icon to see a larger version of the visualization.

Next steps for analysis:

- Use this explanation to understand the composition of the record values that make up the analyzed mark.
- Authors might want to create a new visualization to explore any unvisualized dimension surfaced in this example, the statistical analysis has exposed that many of the rides come from the station neighborhood of Back Bay. Note that Station Neighborhood is an unvisualized dimension that has some relationship to Trip Distance in the underlying data for the source visualization.
Contributing Dimensions

Use this explanation to understand the composition of the record values that make up the analyzed mark.

This explanation type shows that the distribution of an unvisualized dimension may be contributing to the aggregate value of the analyzed mark. This type of explanation is used for target measure sums, counts, and averages. An unvisualized dimension is a dimension that exists in the data source, but isn't currently being used in the view.

**Note:** For definitions of common terms used in explanations, see Terms and concepts in explanations.
This explanation shows:

- The percent of the number of records for all values of a dimension for the analyzed mark (blue bar) versus all values of a dimension for all marks (gray bar) in the source visualization.
- The average of the target measure for all values of a dimension for the analyzed mark (blue bar) all values of a dimension for all marks (gray bar).

Exploration options:

- Hover over each bar to see its details.
- Scroll to see more of the chart.
- Click the Open icon to see a larger version of the visualization.

Next steps for analysis:

- Use this explanation to understand the composition of the record values that make up the analyzed mark.
- Authors might want to create a new visualization to explore any unvisualized dimensions surfaced in this explanation.

In this example, the statistical analysis has exposed that more rides were taken from South Station and MIT and fewer rides were taken from Charles Circle and Kendall, compared to rides taken for marks overall.

Note that Station Name is an unvisualized dimension that has some rela-
Contributing Measures

This explanation type shows that the average of an unvisualized measure may be contributing to the aggregate value of the analyzed mark. An unvisualized measure is a measure that exists in the data source, but isn’t currently being used in the view.

This explanation can reveal a linear or quadratic relationship between the unvisualized measure and the target measure.

**Note:** For definitions of common terms used in explanations, see Terms and concepts in explanations.
This explanation shows:

- The relationship between the sum of the target measure and the average of an unvisualized measure for the analyzed mark (blue circle) and all marks (gray circles) in the view.
- If the sum of the target measure is high or low because the average value of the unvisualized measure is high or low.

Exploration options:

- Hover over each circle to see its details.
- Click the Open icon to see a larger version of the visualization.

Next steps for analysis:

- Authors might want to create a new visualization to explore any unvisualized measures surfaced in this explanation.

In this example, one possible reason why trip distance is high is because the average total time rented is also high.

Other things to explore

This section of the Explain Data pane shows possible reasons why the analyzed mark is unique or unusual. These explanations:

- Do not explain why the value of this mark is what it is.
- Are not related in any way to the value of the measures in the source visualization.
- Do not take any target measures into account.
Other Dimensions of Interest

Use this explanation to understand the composition of the record values that make up the analyzed mark.

The distribution of an unvisualized dimension in the analyzed mark is unusual compared to the distribution of values for all other marks in the view. An unvisualized dimension is a dimension that exists in the data source, but isn't currently being used in the view.

**Note:** For definitions of common terms used in explanations, see Terms and concepts in explanations.

**This explanation shows:**

- The percent of the number of records for all values of a dimension for the analyzed mark (blue bar) versus all values of a dimension for all marks (gray bar) in the source visualization.

**Exploration options:**

- Hover over each bar to see its details.
- Scroll to see more of the chart.
- Click the Open icon to see a larger version of the visualization.

**Next steps for analysis:**

- Use this explanation to understand the composition of the record values that make up the analyzed mark.
- Authors might want to create a new visualization to explore any unvisualized dimensions surfaced in this

In this example, a high percentage of records are associated with overcast weather. Because the data is about bike rentals in Boston, and the analyzed mark is Trip Distance for
August, we can assume that the weather is typically warm and humid. People might have rented bikes more often on overcast days to avoid the heat. It's also possible there were more overcast days in August.

**Analyzed Fields in Explain Data**

When you run Explain Data on a mark, a statistical analysis is run on the aggregated mark, and then on potentially related fields from the data source that aren't represented in the current view.

Explain Data might not include every column from the data source in the analysis. In many cases, certain types of fields will be automatically excluded from the analysis. For more information, see Fields excluded by default.
**Note:** Dimensions with more than 500 unique values won't be considered for analysis (unless allowed by the author in Explain Data Settings).

All users can view information on which fields are included or excluded in the current analysis. Creators and Explorers who have editing permissions can edit the fields used by Explain Data for statistical analysis.

**View fields analyzed by Explain Data**

When you expand an explanation for a measure that is contributing to the value of the mark, a link that indicates the number of fields considered in the analysis is displayed at the bottom of the Explain Data pane.
Click the link to see the list of fields included in or excluded from the current statistical analysis.

When a data source contains more than 1000 unvisualized dimensions or measures, you might see an alert asking if you want Explain Data to consider more fields. Click Explain All to run an analysis that includes more fields. The analysis may take longer to complete.

To view fields used by Explain Data for statistical analysis

1. Run Explain Data on a mark.
2. In the Explain Data pane, under **Contributing to the value of**, click a measure name.
3. Click the *number-of-fields* link at the bottom of the pane.
Change fields used for statistical analysis

Creators and Explorers who have editing permissions can select fields to be included or excluded from the statistical analysis in the Fields tab of the Explain Data Settings dialog box.
When a data source contains dimensions with a large number of unique values (up to 500), those fields won't be considered for analysis.

To edit the fields used by Explain Data for statistical analysis

Settings for analyzed fields are applied at the data source level.

1. Run Explain Data on a mark when editing a view.
2. In the Explain Data pane, click the settings icon at the bottom of the Explain Data pane. Or, click the **Edit** button in the Analyzed Fields view (how to open analyzed fields).
3. In the Explain Data Settings dialog box, click the **Fields** tab.

4. Click a drop-down arrow next to a field name, select **Automatic** or **Never Include**, and then click **OK**.

Note that fields must have less than 500 unique values to be included in the analysis.
Fields excluded by default

All unvisualized measures when there are more than 1,000 measures in the data source.

All unvisualized dimensions when there are more than 1,000 dimensions in the data source.

Reasons for exclusion

Computing explanations for more than 1000 unvisualized measures or dimensions can take longer to compute, sometimes several minutes. These fields are excluded by default for initial analysis, but you can choose to include them for further analysis.

In this situation, you might see an alert asking if you want Explain Data to consider more fields. Click the alert link to get more information. Click Explain All to run an analysis that includes more fields.
### Fields excluded by default

<table>
<thead>
<tr>
<th>Fields that use geometry, latitude, or longitude</th>
<th>Reasons for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields that use geometry, latitude, or longitude</td>
<td>Geometry, latitude, or longitude by themselves can never be explanations. It is highly likely that an explanation that calls out the latitude or the longitude as an explanation is due to a spurious correlation and not a probable explanation.</td>
</tr>
</tbody>
</table>

| Dimensions with high cardinality (dimensions with > 500 members) | High cardinality dimensions take longer to compute. Dimensions with more than 500 unique values will not be considered for analysis. |

<table>
<thead>
<tr>
<th>Groups, bins, or sets</th>
<th>Not currently supported.</th>
</tr>
</thead>
</table>

| Table calculations | Table calculations cannot be analyzed when table calculations are at a different level of detail than the view. |

| Unvisualized measures that can't be averaged | Unvisualized measures that can't be averaged include measures that are calculated fields where the calculation expression includes aggregations (display as AGG() fields when added to the sheet). |

| Discrete measures and continuous dimensions | Not currently supported. |

| Hidden fields | Not available. |

| Calculated fields with errors | No values present to analyze. |

### Requirements and Considerations for Using Explain Data

Explain Data is always available to authors in Tableau Desktop.

For Tableau Online and Tableau Server: When Explain Data is enabled for a site, Creators and Explorers with the appropriate permissions can run Explain Data when editing a work-
book. Authors can allow any user to run Explain Data in viewing mode in published workbooks. For more information, see Control Access to Explain Data.

What makes a viz a good candidate for Explain Data

Explain Data works best on visualizations that require deeper exploration and analysis, rather than infographic-style, descriptive vizzes that communicate summarized data.

- Row-level data is necessary for Explain Data to create models of your data and generate explanations. Vizzes with underlying, row-level data, where relationships might exist in unvisualized fields are good candidates for running Explain Data.
- Vizzes based on pre-aggregated data without access to row-level data are not ideal for the statistical analysis performed by Explain Data.

What data works best for Explain Data

When you are using Explain Data in a worksheet, remember that Explain Data works with:

- **Single marks only**—Explain Data must be run on a single mark. Multiple mark analysis is not supported.

- **Aggregated data**—The view must contain one or more measures that are aggregated using SUM, AVG, COUNT, or COUNTD. At least one dimension must also be present in the view.

- **Single data sources only**—The data must be drawn from a single, primary data source. Explain Data does not work with blended or cube data sources.

When preparing a data source for a workbook, keep the following considerations in mind if you plan to use Explain Data during analysis.

- Use a data source with underlying data that is sufficiently wide. An ideal data set has at least 10-20 columns in addition to one (or more) aggregated measures to be explained.
- Give columns (fields) names that are easy to understand.
- Eliminate redundant columns and data prep artifacts. For more information, see Change fields used for statistical analysis.
Don't discard unvisualized columns in the data source. Explain Data considers fields in the underlying data when it analyzes a mark.

Low cardinality dimensions work better. The explanation of a categorical dimension is easier to interpret if its cardinality is not too high (<20 categories). Dimensions with more than 500 unique values will not be considered for analysis.

Don't pre-aggregate data as a general rule. But if the data source is massive, consider pre-aggregating the data to an appropriate level of detail.

Use extracts over live data sources. Extracts run faster than live data sources. With live data sources, the process of creating explanations can create many queries (roughly one query per each candidate explanation), which can result in explanations taking longer to be generated.

Situations where Explain Data is not available

Sometimes Explain Data will not be available for a selected mark, depending on the characteristics of the data source or the view. If Explain Data cannot analyze the selected mark, the Explain Data icon and context menu command will not be available.

Explain Data can't be run in views that use:

- Map coordinate filters
- Blended data sources
- Data sources with parameters
- Data sources that don't support COUNTD or COUNT(DISTINCT ...) syntax, such as Access.
- Filters on aggregate measures
- Disaggregated measures

Explain Data can't be run if you select:

- Multiple marks
- Axis
- Legend
- Grand total
- Trend line or reference line
- A mark in a view that contains a very low number of marks

Explain Data can't be run when the measure to be used for an

- Isn't aggregated using SUM, AVG, COUNT, COUNTD
Control Access to Explain Data

Your access to Explain Data will vary depending on your site role and content permissions. Explain Data is always available to authors in Tableau Desktop. Authors with appropriate permissions can run Explain Data in editing mode in Tableau Online and Tableau Server.

Authors can also control whether Explain Data is available in viewing mode in published workbooks and which explanation types are displayed in the Explain Data pane.

Be aware that Explain Data can surface values from dimensions and measures in the data source that aren't represented in the view. As an author, you should run Explain Data and test the resulting explanations to make sure that sensitive data isn't being exposed in your published workbooks.

Who can access Explain Data

Explain Data is enabled by default at the site level. Server administrators (Tableau Server) and site administrators (Tableau Online) can control whether Explain Data is available for a site. For more information, Disable or Enable Explain Data for a Site.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Who Can Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing mode</td>
<td>Tableau Viewers, Explorers, and Creators who have the Run Explain Data permission capability can run and explore Explain Data explanations in viewing mode.</td>
</tr>
</tbody>
</table>
Tableau Online Help

<table>
<thead>
<tr>
<th>Mode</th>
<th>Who Can Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editing mode</td>
<td>Tableau Creators can run Explain Data when editing a view in Tableau Desktop, Tableau Online, or Tableau Server. Explorers who have the Run Explain Data permission capability and editing permissions can run Explain Data when editing a workbook in Tableau Online or Tableau Server. Creators and Explorers who have editing permissions can open new worksheets for further analysis. They also can use Explain Data Settings to control who can use Explain Data and what they can see.</td>
</tr>
</tbody>
</table>

Control who can use Explain Data and what they can see

A combination of settings must be enabled to make Explain Data available in editing mode and viewing mode in Tableau Online and Tableau Server.

Editing mode

Requirements for authors to run Explain Data or edit Explain Data settings in editing mode:

- Site setting: **Availability of Explain Data** set to **Enable**. Enabled by default.
- Site role: Creator, Explorer (can publish)
- Permissions: **Run Explain Data** capability set to **Allowed**. Unspecified by default. If you open a workbook (Tableau version 2022.1 or earlier) that used this permission in Tableau version 2022.2 or later, you will need to reset the Run Explain Data capability to Allowed.

**Note:** The **Download Full Data** capability for a Creator or Explorer (can publish) controls whether they see the View Full Data option in Extreme Values explanations. Viewers are always denied the Download Full Data capability. However, all users can see
record-level details when the Extreme Values explanation type is enabled in Explain Data settings.

Creators and Explorers with editing permissions and the Run Explain Data permission capability can access Explain Data Settings, which provide options for controlling:

- The explanation types that are displayed in the Explain Data pane.
- The fields that are included in, or excluded from statistical analysis.

These options are set for the entire workbook and can only be set in the Explain Data Settings dialog box.

Viewing mode

Requirements for all users to run Explain Data in viewing mode:

- Site setting: Availability of Explain Data set to Enable. Enabled by default.
- Site role: Creator, Explorer, or Viewer
- Permissions: Run Explain Data capability set to Allowed. Unspecified by default. If you open a workbook (Tableau version 2022.1 or earlier) that used this permission in Tableau version 2022.2 or later, you will need to reset the Run Explain Data capability to Allowed.

Open the Explain Data Settings dialog box

1. From the Analysis menu, select Explain Data, and then click Settings. Or, in the Explain Data pane, click the settings icon (bottom right).
Include or exclude explanation types displayed by Explain Data

Creators and Explorers who have editing permissions can choose to exclude (or include) explanation types displayed for all workbook users.

1. In the Explain Data Settings dialog box, click the Explanation Types tab.

2. In the list of explanation types, select or clear an explanation type.

3. Click OK.
Test the setting by saving and closing the published workbook, and then opening a view from the workbook in viewing mode. Select a mark that typically has Extreme Value explanations, and then run Explain Data to check the explanation results.

Include or exclude fields used for statistical analysis

Creators or Explorers who have editing permissions can choose to exclude (or include) fields that are eligible for analysis.

1. In the Explain Data pane (bottom right), click the settings icon. Or, click the Edit button in the Analyzed Fields view.

2. In the Explain Data Settings dialog box, click the Fields tab.
3. In the list of fields under Include, click the drop-down arrow and select Automatic to include an eligible field every time Explain Data runs for that workbook.

Note that fields must have less than 500 unique values to be included in the analysis.
Select **Never Include** to explicitly exclude the field.
Select **Include None** to run a statistical analysis on the data without considering fields.
Select **Reset** to return to the default settings.

4. Click **OK**.

Test the setting by saving the published workbook. Select a mark, and then run Explain Data to check the explanation results.

**How Explain Data Works**

Use Explain Data as an incremental, jumping-off point for further exploration of your data. The possible explanations that it generates help you to see the different values that make up or relate to a selected mark in a view. It can tell you about the characteristics of the data points in the data source, and how the data might be related (correlations) using statistical modeling. These explanations give you another tool for inspecting your data and finding
interesting clues about what to explore next.

**Note:** Explain Data is a tool that uncovers and describes relationships in your data. It can’t tell you what is causing the relationships or how to interpret the data. **You are the expert on your data.** Your domain knowledge and intuition is key in helping you decide what characteristics might be interesting to explore further using different views.

For related information on how Explain Data works, and how to use Explain Data to augment your analysis, see these Tableau Conference presentations:

- From Analyst to Statistician: Explain Data in Practice (1 hour)
- Leveraging Explain Data (45 minutes)
- Explain Data Internals: Automated Bayesian Modeling (35 minutes)

**What Explain Data is (and isn’t)**

**Explain Data is:**

- A tool and a workflow that leverages your domain expertise.
- A tool that surfaces relationships in your data and recommends where to look next.
- A tool and a workflow that helps expedite data analysis and make data analysis more accessible to a broader range of users.

**Explain Data is not:**

- A statistical testing tool.
- A tool to prove or disprove hypotheses.
- A tool that is giving you an answer or telling you anything about causality in your data.

When running Explain Data on marks, keep the following points in mind:

- **Consider the shape, size, and cardinality of your data.** While Explain Data can be used with smaller data sets, it requires data that is sufficiently wide and contains enough marks (granularity) to be able to create a model.

- **Don’t assume causality.** Correlation is not causation. Explanations are based on models of the data, but are not causal explanations.
A correlation means that a relationship exists between some data variables, say A and B. You can't tell just from seeing that relationship in the data that A is causing B, or B is causing A, or if something more complicated is actually going on. The data patterns are exactly the same in each of those cases and an algorithm can't tell the difference between each case. Just because two variables seem to change together doesn't necessarily mean that one causes the other to change. A third factor could be causing them both to change, or it may be a coincidence and there might not be any causal relationship at all.

However, you might have outside knowledge that is not in the data that helps you to identify what's going on. A common type of outside knowledge would be a situation where the data was gathered in an experiment. If you know that B was chosen by flipping a coin, any consistent pattern of difference in A (that isn't just random noise) must be caused by B. For a longer, more in-depth description of these concepts, see the article *Causal inference in economics and marketing* by Hal Varian.

**How explanations are analyzed and evaluated**

When you run Explain Data on a mark, a statistical analysis is run on the aggregated mark and then on possibly related data points from the data source that aren't represented in the current view.

Explain Data first predicts the value of a mark using only the data that is present in the visualization. Next, data that is in the data source (but not in the current view) is considered and added to the model. The model determines the range of predicted mark values, which is within one standard deviation of the predicted value.

**What is an expected range?**

The expected value for a mark is the median value in the expected range of values in the underlying data in your viz. The expected range is the range of values between the 15th and 85th percentile that the statistical model predicts for the analyzed mark. Tableau determines the expected range each time it runs a statistical analysis on a selected mark.
Possible explanations are evaluated on their explanatory power using statistical modeling. For each explanation, Tableau compares the expected value with the actual value.

<table>
<thead>
<tr>
<th>value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher than expected / Lower than expected</td>
<td>If an expected value summary says the mark is lower than expected or higher than expected, it means the aggregated mark value is outside the range of values that a statistical model is predicting for the mark. If an expected value summary says the mark is slightly lower or slightly higher than expected, or within the range of natural variation, it means the aggregated mark value is within the range of predicted mark values, but is lower or higher than the median.</td>
</tr>
<tr>
<td>Expected Value</td>
<td>If a mark has an expected value, it means its value falls within the expected range of values that a statistical model is predicting for the mark.</td>
</tr>
<tr>
<td>Random Variation</td>
<td>When the analyzed mark has a low number of records, there may not be enough data available for Explain Data to form a statistically significant explanation. If the mark’s value is outside the expected range, Explain Data can’t determine whether this unexpected value is being caused by random variation or by a meaningful difference in the underlying records.</td>
</tr>
<tr>
<td>No Explanation</td>
<td>When the analyzed mark value is outside of the expected range and it does not fit a statistical model used for Explain Data, no explanations are generated.</td>
</tr>
</tbody>
</table>

Models used for analysis

Explain Data builds models of the data in a view to predict the value of a mark and then determines whether a mark is higher or lower than expected given the model. Next, it considers additional information, like adding additional columns from the data source to the view, or flagging record-level outliers, as potential explanations. For each potential explanation, Explain Data fits a new model, and evaluates how unexpected the mark is given the
new information. Explanations are scored by trading off complexity (how much information is added from the data source) against the amount of variability that needs to be explained. Better explanations are simpler than the variation they explain.

<table>
<thead>
<tr>
<th>Explanation type</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme values</td>
<td>Extreme values are aggregated marks that are outliers, based on a model of the visualized marks. The selected mark is considered to contain an extreme value if a record value is in the tails of the distribution of the expected values for the data. An extreme value is determined by comparing the aggregate mark with and without the extreme value. If the mark becomes less surprising by removing a value, then it receives a higher score. When a mark has extreme values, it doesn't automatically mean it has outliers, or that you should exclude those records from the view. That choice is up to you depending on your analysis. The explanation is simply pointing out an interesting extreme value in the mark. For example, it could reveal a mistyped value in a record where a banana cost 10 dollars instead of 10 cents. Or, it could reveal that a particular sales person had a great quarter.</td>
</tr>
<tr>
<td>Number of records</td>
<td>The number of records explanation models the aggregate sum in terms of the aggregate count; average value of records models it in terms of the aggregate average. The better the model explains the sum, the higher the score. This explanation describes whether the sum is interesting because the count is high or low, or because the average is high or low.</td>
</tr>
<tr>
<td>Average value of the mark</td>
<td>This type of explanation is used for aggregate marks that are sums. It explains whether the mark is consistent with the other</td>
</tr>
<tr>
<td>Explanation type</td>
<td>Evaluation</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>marks because in terms of its aggregate count or average, noting the relation ( \text{SUM}(X) = \text{COUNT}(X) \times \text{AVG}(X) ).</td>
</tr>
<tr>
<td></td>
<td>This explanation describes whether the sum is interesting because the count is high or low, or because the average is high or low.</td>
</tr>
<tr>
<td>Contributing Dimensions</td>
<td>This explanation models the target measure of the analyzed mark in terms of the breakdown among categories of the unvisualized dimension. The analysis balances the complexity of the model with how well the mark is explained.</td>
</tr>
<tr>
<td></td>
<td>An <em>unvisualized dimension</em> is a dimension that exists in the data source, but isn't currently being used in the view. This type of explanation is used for sums, counts and averages.</td>
</tr>
<tr>
<td></td>
<td>The model for unvisualized dimensions is created by splitting out marks according to the categorical values of the explaining column, and then building a model with the value that includes all of the data points in the source visualization. For each row, the model attempts to recover each of the individual components that made each mark. The analysis indicates whether the model predicts the mark better when components corresponding to the unvisualized dimension are modeled and then added up, versus using a model where the values of the unvisualized dimension are not known.</td>
</tr>
<tr>
<td></td>
<td>Aggregate dimension explanations explore how well mark values can be explained without any conditioning. Then, the model conditions on values for each column that is a potential explanation. Conditioning on the distribution of an explanatory column should result in a better prediction.</td>
</tr>
<tr>
<td>Contributing</td>
<td>This explanation models the mark in terms of this unvisualized</td>
</tr>
</tbody>
</table>
**Explanation type**

**Evaluation**

**Measures**

measure, aggregated to its mean across the visualized dimensions. An *unvisualized measure* is a measure that exists in the data source, but isn’t currently being used in the view.

A Contributing Measures explanation can reveal a linear or quadratic relationship between the unvisualized measure and the target measure.

**Disable or Enable Explain Data for a Site**

Explain Data is enabled for sites by default, but Tableau administrators may disable it.

1. Go to the **General** site settings.

2. (Tableau Server only) In the **Web Authoring** section, select Let users edit workbooks in their browser.

3. In the **Availability of Explain Data** section, select from these options:

   - **Enable** lets Creators and Explorers with the appropriate permissions run Explain Data in editing mode. Lets all users with appropriate permissions run Explain Data when it is enabled for viewing mode.

   - **Disable** prevents all users from running Explain Data or accessing Explain Data settings in workbooks.

**Identify Outliers with Data Change Radar (Limited Preview)**

In Tableau Online and Tableau Server, Data Change Radar shows data that falls outside of expected ranges, revealing changes you may want to explore further.

**Tip:** Data Change Radar is available exclusively to customers participating in a limited
If you're a Tableau administrator and would like your organization to join the preview, sign up here.

How Data Change Radar determines expected ranges

In tracked views, Tableau captures the value of each visualized measure over time. For each visualized measure, up to 960 recent data points are captured, either at each extract refresh for a workbook, or once every four hours, whichever is less frequent. With this data, Tableau trains a predictive model to accurately determine expected ranges for your data.

**Note:** Measures from a data source that don't appear in a view are not tracked, conserving system resources.

Which views are tracked?

In addition to permission to access a view, a few other requirements are necessary for Data Change Radar to show outliers to you.

- **Extracts are required for all data sources** in the published workbook.
- **Row-level security cannot be present** in the data source or view.
- **The view must be popular** and in the top 1% most accessed on your site in the last 30 days.

See recommended views with unexpected data changes

Tableau automatically recommends views with unexpected data changes detected in the last 24 hours. To ensure that these data changes are relevant to you, Tableau recommends only views you have favorited or accessed in the last 30 days, or that the Tableau recommendations engine thinks are important.

1. From the left pane of Tableau Online and Tableau Server, click Home or Recommendations to see views with data changes that might interest you.
Here's how a recommended data change appears on the Home page:

2. If the Data Change icon appears, hover over the view thumbnail to see a brief description. If the change interests you, click the thumbnail to open the view and automatically display the Data Changes pane.

Explore unexpected data changes

1. Click a thumbnail for a recommended view to open it.
2. In the Data Changes pane at right, click the Filter by menu. Then choose Latest to see changes from the last 24 hours, or All to see changes from the last 21 days.
3. In the list of changes, hover over a change to see the corresponding mark highlighted in the view.

4. Click a change in the list to see how the measure values have changed over time.
5. In the graph that appears, the amber area indicates the expected data range for up to the last 30 days.

Do any of the following:

- In the **Zoom** section, click 1D, 7D, or 14D to show data from the most recent 1, 7, or 14 day period. Or click Max to show data up to the last 21 days and 960 data points.
- Drag over the graph to see values captured at each data point.
- Below the graph, drag and resize the gray area to customize the displayed time range.
Tableau found that AGG(SUM(1)) O was lower than predicted, 2 wk. ago.

**AGG(SUM(1))**

72

Recorded last wk., 1/7/2022 8:04 PM

Within predicted range 🌟
6. To return to the complete list of changes, click the arrow to the left of the change name.

Tip: If you accidentally close the Data Changes panel, to re-open it, return to the Home or Recommendations section of your site.

Use Accelerators to Quickly Visualize Data

Tableau Accelerators are pre-built dashboards designed to help you get a jumpstart on data analysis. Tailored to specific industries and enterprise applications, Accelerators are built with sample data that you can swap out for your own data, allowing you to discover insights with minimal setup.
Salesforce Sales Cloud Pipeline Accelerator

Where to find Accelerators

You can access the complete set of Accelerators on the Tableau Exchange and in Tableau Desktop. Additionally, select Accelerators are available to use when you create a workbook in Tableau Online.

On the Tableau Exchange website

1. Visit the Accelerators page on the Tableau Exchange website. You can filter to find Accelerators based on the industry they are applicable to and the type of data they connect to.

2. Sign in to the Tableau Exchange website. If you don’t have an account, create one.

3. When you find an Accelerator you want to use, click Download to get the TWBX file.

Because Accelerators are simply packaged workbooks, you can open the downloaded file in Tableau Desktop or upload it to your site on Tableau Online or Tableau
Server. For information about uploading workbooks, see Upload Workbooks to a Tableau Site.

In Tableau Desktop

1. On the Start Page in Tableau Desktop, click **More Accelerators**.

2. The Accelerators in this list are the same as those shown on the Tableau Exchange website, with the added convenience that you can open the Accelerators without leaving Tableau Desktop.

3. When you find an Accelerator you want to use, click **Open** to start working with it.

In Tableau Online

Select Accelerators are available for you to use when you create a workbook Tableau Online. These Accelerators connect to cloud-based data like Salesforce, ServiceNow ITSM, LinkedIn Sales Navigator, Marketo, and Oracle Eloqua.

1. If you’re a Creator in Tableau Online, navigate to the Home or Explore page, then click the **New** button and select **Workbook**.
Note: Site administrators can also access Accelerators from the Home page, under Accelerators.

2. At the top of the Connect to Data window, click Accelerator to browse the selection of Accelerators available to connect to on Tableau Online.

You can upload Accelerators from the Tableau Exchange to Tableau Online and use them as you would in Tableau Desktop. However, you will need to follow the Tableau Exchange instructions to get your data into the Accelerator instead of the Tableau Online instructions.

Use an accelerator from the Tableau Exchange

Follow the instructions in this section to use an Accelerator that you have downloaded from the Tableau Exchange website or opened from within Tableau Desktop. For instructions on using Accelerators when you create a workbook in Tableau Online, see Use an Accelerator directly in Tableau Online.
Add your data to the Accelerator

Accelerators come with sample data that you can use to explore the concepts illustrated in the dashboard. To get the most value from an Accelerator, replace the sample data with your own data. There are two methods by which you can add your data to the Accelerator: replace the data source with a new data source (method 1) or add a new connection to the existing data source (method 2).

<table>
<thead>
<tr>
<th>Method 1</th>
<th>Method 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works with data sources that have more than one table.</td>
<td>Data sources must have only one physical table.</td>
</tr>
<tr>
<td>Allows you to change field names in Tableau Desktop to match the Accelerator.</td>
<td>Doesn’t allow you to change field names in Tableau Desktop, which means that the field names in your data source must match the fields in the Accelerator.</td>
</tr>
<tr>
<td>Doesn’t preserve the folder structure in the Accelerator.</td>
<td>Preserves the folder structure defined in the Accelerator.</td>
</tr>
</tbody>
</table>

Method 1: Replace the data source

1. With the Accelerator open in Tableau Desktop, click **Data > New Data Source**.

2. Connect to the data you want to use. For more information, see **Connect to Your Data**. If you are using a Salesforce Accelerator, make sure your account has API.
access to your Salesforce instance.

3. On the Data Source tab, drag tables onto the canvas to build your new data source. For more information, see Use Relationships for Multi-table Data Analysis.

4. Open any worksheet in the Accelerator, then click Data > Replace Data Source. This option is not available on dashboard or story tabs. For more information, see Replace Data Sources.

5. Under Replacement, select the data source you added, then click OK.

6. In the Data pane, right-click the original data source, then click Close. For more information, see Close Data Sources.
Fix broken references

If the new data source doesn’t have the same field names as the original, parts of the Accelerator will be blank. Replace the broken references on the affected worksheets so that they use the correct fields from your new data source. For more information, see Replace Field References.

Method 2: Edit the data source

1. With the Accelerator open in Tableau Desktop, click the Data Source tab.

2. Next to Connections, click Add. Connect to the data you want to use. For more information, see Connect to Your Data.
3. On the data source canvas, double-click the logical table to open the physical table. For information about logical and physical tables, see Layers of the data model.

4. Drag the table from the data source you added and drop it onto the existing physical table to replace the sample data. Your data source must be only one physical table.
5. Under connections, right-click the connection for the sample data, then select **Remove**.

**Use an Accelerator directly in Tableau Online**

A limited number of Accelerators are available for you to use when you create a workbook in Tableau Online. These Accelerators prompt you to connect directly to a cloud-based data source, rather than requiring you to add data manually.

1. On Tableau Online, create a new workbook.

2. At the top of the Connect to Data window, click **Accelerator**.

3. From the list of pre-built designs, find an option that reflects the data source and business metrics you need, and click **Use Dashboard**.

4. To quickly see how a workbook looks with sample data, click **Continue without signing in**. Or click **Continue** to create a workbook with your data.
5. Specify a name and containing project for the workbook.

6. If you chose to create a workbook with your data, connect to your data source. While Tableau prepares an extract of your data, sample data appears so you can explore the layout.

**Note:** If you download an Accelerator from the Tableau Exchange with the intention of uploading it to Tableau Online, you will need to replace the data by following the instructions under Use an accelerator from the Tableau Exchange.

Change permissions to share Accelerators with colleagues

To avoid exposure of confidential data, workbooks for Accelerators are visible only to authors and administrators by default. To share a Accelerator with your colleagues, follow these simple steps:

1. In Tableau Online, navigate to the workbook for the Accelerator.

2. Select the workbook, click **Actions**, and choose **Permissions**.

3. Give View permissions to any user or group you want to see the dashboard. For more information, see Edit Permissions in Tableau Online Help.

Replace sample data with your data

If you chose to quickly load sample data in a dashboard, you can replace it with your data at any time.

1. In Tableau Online, navigate to the workbook for the Accelerator.

2. On the **Data Sources** tab, select the data source. From the Actions menu, choose **Edit Connection**.

3. For authentication, select **Embedded credentials in the connection**, and either...
choose an existing user account or add a new one. Then click **Save**.

4. On the **Refresh Schedules** tab, select the schedule. From the Actions menu, choose **Run Now**.

**Fix grayed-out views by replacing field names**

If your organization has customized the data structure for a cloud-based system, you may need to match those changes in Accelerators after your data loads in them. For example, if your organization has renamed the Salesforce “Account” field to “Customer”, you’ll need to make a corresponding change in Accelerators to avoid grayed-out views like this:

![Opportunity Analysis](image)

Fortunately, the fix is pretty straightforward:

1. Above the dashboard, click **Edit**.

2. **Navigate directly to the grayed-out sheet**.

3. In the Data pane at left, look for red exclamation points (!) next to field names, which indicate that your organization uses different names.
4. Right-click each of those fields, and choose Replace References. Then select the correct field name from the list.

Fix empty dashboards by changing default date ranges

If a dashboard looks completely empty, the likely cause is a default date range that doesn't correspond to the dates in your source data.

1. Download the workbook, and open it in Tableau Desktop.

2. Click the Data Source tab.
3. In the upper-left corner, click the arrow next to the data source name, and choose **Edit Connection**. Then sign in.

4. Specify a date range that reflects the dates in your data, and click **Connect**.

5. Choose **Server > Publish Data Source** to update extracts of the data on Tableau Online.

**Use Dashboard Extensions**

Extensions let you add unique features to dashboards or directly integrate them with applications outside Tableau. Adding extensions is easy; you incorporate them into dashboard layouts just like other dashboard objects.

Extensions expand dashboard functionality with the help of web applications created by third-party developers. If you're a developer and want to create your own extensions, see the **Tableau Extensions API documentation** on GitHub.

**Note**: Tableau administrators can turn off dashboard extensions for **Tableau Desktop**, **Tableau Server**, and **Tableau Online**.
Add an extension to a dashboard

1. In a Tableau workbook, open a dashboard sheet.

2. From the **Objects** section, drag **Extension** to the dashboard.

3. In the “Add an Extension” dialog box, do either of the following:
   
   - Search for and select an extension.
   
   - Click **Access Local Extensions**, and navigate to a .trex file you previously downloaded.

4. If prompted, allow or deny the dashboard extension access to data in the workbook. For more information, see Data security, Network-enabled, and Sandboxed extensions.

   If you allow access, follow any on screen instructions for configuring the extension.

**Note**: If you're using Tableau Server or Tableau Online, Extension objects will appear blank in prints, PDFs, and images of dashboards (including images in subscription emails).
Configure a dashboard extension

Some dashboard extensions provide configuration options that let you customize features.

1. Select the extension in the dashboard, and from the drop-down menu in the upper-right corner, choose **Configure**.

2. Follow the on-screen instructions to configure the extension.

Reload a dashboard extension

If a dashboard extension becomes unresponsive, you might need to reload it, which is similar to refreshing a web page in a browser.

1. Select the extension in the dashboard, and from the drop-down menu in the upper-right corner, choose **Reload**.

   The dashboard extension is refreshed and set to its original state.

2. If reloading the extension fails to return it to a useable state, try removing it from the dashboard and adding it again.
Data security, Network-enabled, and Sandboxed extensions

Dashboard extensions are web applications that come in two forms:

- *Network-enabled extensions* run on web servers located outside of your local network.
- *Sandboxed extensions* run in a protected environment without access to any other resource or service on the web.

Before adding a Network-enabled extension or viewing a dashboard with one, be certain that you trust the website that hosts it. By default, dashboard extensions use the HTTPS protocol, which guarantees an encrypted channel for sending and receiving data, and ensures some privacy and security.

For more information about data security when using dashboard extensions, see Extension Security - Best Practices for Deployment.

Allow or deny data access to a Network-enabled extension

Depending on how an extension is designed, it can access either visible data in a view, or full underlying data, table and field names from data sources, and information about data source connections. When you add an extension, or view a dashboard with one, you’re given an opportunity to allow or deny the extension to run and access this data.

If you’re viewing a dashboard with an extension that requires full data access, and that access has been denied, a message appears in place of the extension. If you trust the extension and want to use it, you can reset permissions and allow the extension to run.
1. Select the extension in the dashboard, and from the drop-down menu in the upper-right corner, choose **Reset Permissions**.

2. Click either **Allow** to let the extension run and access data, or **Deny** to prevent the extension from running.

Ensure that JavaScript is enabled in Tableau Desktop

Dashboard extensions interact with data using the Tableau Extensions API library, a JavaScript library. If you want to use extensions, be sure that JavaScript is enabled in the dashboard security settings:

Choose **Help > Settings and Performance > Set Dashboard Web View Security > Enable JavaScript**.

Ensure that extensions run on Tableau Online or Tableau Server

You can add extensions to workbooks you publish from Tableau Desktop or directly in the web-authoring mode of Tableau Online and Tableau Server. A Tableau administrator must allow extensions to run on a site and add Network-enabled extensions to a safe list. Administrators should only allow extensions that you have tested and trust.
If you want to use a dashboard extension on Tableau Online or Tableau Server, direct your administrator to Manage Dashboard Extensions in Tableau Online or Manage Dashboard Extensions in Tableau Server.

Supported web browsers for Sandboxed extensions

Sandboxed extensions run in all browsers supported Tableau Server and Tableau Online except Internet Explorer 11.

Supported versions of Tableau Server for Sandboxed extensions

You can use Sandboxed extensions in Tableau Server 2019.4 and later.

Get support for dashboard extensions

To get help for an extension, you'll need to contact the developer or company who created it.

1. Select the extension in the dashboard, and from the drop-down menu in the upper-right corner, choose About.

2. Click Get Support to go to the support page of the extension developer.
Note: Tableau doesn’t provide support for extensions or for other programs that interface with the Extensions API. However, you can submit questions and ask for help in the Tableau developer community.

Format Animations

Animate visualizations to better highlight changing patterns in your data, reveal spikes and outliers, and see how data points cluster and separate.

Animations visually transition between filter, sort, and zoom settings, different pages, and changes to filter, parameter, and set actions. As visualizations animate in response to these changes, viewers can more clearly see how data differs, helping them make better informed decisions.
Understanding simultaneous and sequential animations

When you author animations, you can choose between two different styles: simultaneous or sequential. Here are examples of each type.

Simultaneous animations

The default simultaneous animations are faster and work well when showing value changes in simpler charts and dashboards.

Sequential animations

Sequential animations take more time but make complex changes clearer by presenting them step-by-step.
Animate visualizations in a workbook

When you create a new workbook, Tableau enables animations for your viz by default. You can turn animations on or off at the user and workbook level.


2. If you want to animate every sheet, under Workbook Default, click On. Then do the following:
   - For Duration, choose a preset, or specify a custom duration of up to 10 seconds.
   - For Style, choose Simultaneous to play all animations at once or Sequential to fade out marks, move and sort them, and then fade them in.

3. To override workbook defaults for a particular sheet, change the settings under Selected Sheet.

Note: In the Selected Sheet section, “(Default)” indicates a setting that auto-
matically reflects the related Workbook Default setting.
To replay an animation, click the **Replay** button in the toolbar. From the **Replay** button, you can also choose the speed at which the animation replays: actual speed, 2x speed, or 1/2 speed.

![Animation Speed Options]

**Reset animation settings for a workbook**

You can reset animations to return an entire workbook to the default animation settings. Be aware that this turns animations off by default.

1. Choose **Format > Animations**.
2. In the middle of the **Animations** pane, click **Reset All Sheets**.

**Completely disable all animations**

When you create a new workbook, animations are enabled by default. If you find animations distracting while viewing vizzes, you can completely disable them so they never play. (This isn't a system-wide setting; each user needs to apply it separately.)

- In Tableau Desktop, choose **Help > Settings and Performance**, and deselect **Enable Animations**.
- In Tableau Online or Tableau Server, click your profile image or initials in the top right corner of the browser, and choose **My Account Settings**. Then scroll down to the bottom of the page, deselect **Enable animations**, and click **Save Changes**.

**Note:** When animations are disabled, you can still choose **Format > Animations** in authoring mode and adjust settings—but they will have no effect.
Format decimals for axes animations

If the number of decimal places for a measure is set to the default, then the number of decimals shown during the axis animation might fluctuate during the axes animation. To avoid this, format the number of decimal places displayed for a measure. For more information, see Format Numbers and Null Values.

Why animations won't play

Server rendering

Animations won't play if a viz is server-rendered. To ensure that vizzes render on a client computer or mobile device, use these techniques:

- If you're a viz author, reduce viz complexity.
- If you're a Tableau Server administrator, increase the complexity threshold for client-side rendering.

**Note:** On computers with lower processing power, animations may appear choppy, but users can continue to interact with vizzes without any delays in responsiveness.

Unsupported browsers and features

Animations are supported by all web browsers except Internet Explorer.

The following Tableau features don’t animate:

- Maps, polygons, and density marks in web browsers
- Pie and text marks
- Headers
- Forecasts, trends, and reference lines
Page history trails (If a viz includes these, turn off animations to avoid unexpected behavior.)

URL Actions

A URL action is a hyperlink that points to a web page, file, or other web-based resource outside of Tableau. You can use URL actions to create an email or link to additional information about your data. To customize links based on your data, you can automatically enter field values as parameters in URLs.

Tip: URL actions can also open in a web page object in a dashboard. See Actions and Dashboards to learn more.

A URL action run from a tooltip menu. The link reflects the action name, not the target URL.

Open a web page with a URL action

1. On a worksheet, select Worksheet > Actions. From a dashboard, select Dashboard > Actions.
2. In the Actions dialog box, click Add Action and then select Go to URL.
3. In the next dialog box, enter a name for the action. To enter field variables in the name, click the Insert menu to the right of the Name box.
4. Use the drop-down list to select a source sheet or data source. If you select a data source or dashboard you can select individual sheets within it.

![Source Sheets]

5. Select how users will run the action.

**If you choose this option...**

- **Hover**: Mouses over a mark in the view. This option works best for highlight actions within a dashboard.

- **Select**: Clicks a mark in the view. This option works well for all types of actions.

- **Menu**: Right-clicks (control-clicks on Mac) a selected mark in the view, then clicks an option in a tooltip (menu). This option works particularly well for URL actions.

6. For URL Target, specify where the link will open:

   - **New Tab if No Web Page Object Exists** — Ensures that the URL opens in a browser on sheets that lack web page objects. This is a good choice when Source Sheets is set to All or a data source.
   
   - **New Browser Tab** — Opens in the default browser.
Web Page Object — (Available only for dashboards with Web Page objects)
Opens in the web page object you select.

7. Enter a URL
   - The URL should start with one of the following prefixes: http, https, ftp, mailto, news, gopher, tsc, tsl, sms, tel, file

   **Note:** If no prefix is entered, http:// is automatically appended to the beginning and the URL action will work in Tableau Desktop. However, if a URL action with no prefix is published to Tableau Server or Tableau Cloud, it will fail in the browser. Always provide a fully qualified URL for actions if the dashboard will be published.

   **Note:** You can specify an ftp address only if the dashboard doesn't contain a web object. If a web object exists, the ftp address won't load.

   - Tableau Desktop also supports local paths like C:\Example folder-example.txt
   - To enter field and filter values as dynamic values in the URL, click the Insert menu to the right of the URL. Be aware that any referenced fields must be used in the view. For details, see Using field and filter values in URLs.
Below the URL you enter is a hyperlinked example you can click for testing.
8. (Optional) In the Data Values section, select any of the following options:
   - **Encode Data Values that URLs Do Not Support** — Select this option if your data contains values with characters that browsers don’t allow in URLs. For example, if one of your data values contains an ampersand, such as “Sales & Finance,” the ampersand must be translated into characters that your browser understands.
   - **Allow Multiple Values via URL Parameters** — Select this option if you are linking to a web page that can receive lists of values via parameters in the URL. For example, say you select several products in a view and you want to see each product’s details hosted on a webpage. If the server can load multiple product details based on a list of identifiers (product ID or product name), you could use multi-select to send the list of identifiers as parameters.

When you allow multiple values, you must also define the delimiter escape character, which is the character that separates each item in the list (for example, a comma). You must also define the Delimiter Escape, which is used if the delimiter character is used in a data value.

### Create an email with a URL action

1. On a worksheet, select **Worksheet > Actions**. From a dashboard, select **Dashboard > Actions**.
2. In the Actions dialog box, click **Add Action**, and select **Go to URL**.
3. In the Source Sheets drop-down list, select the sheet that contains the field with the email addresses you want to send to.
4. In the URL box, do the following:
   - Type `mailto:` and click the Insert menu at right to select the data field that contains email addresses.
   - Type `?subject=` and enter text for the Subject line.
   - Type `&body=` and click the Insert menu at right to select the fields of information that you want to include in the body of the email.

In the example below, the “Email” field contains the email addresses, the subject is “City Information”, and the body text of the email consists of the city and state data that is associated with the email address.
5. (Optional) Display data from your workbook in the body of your email as a vertical list instead of the default horizontal list. For example, suppose you have a horizontal list of cities, such as Chicago, Paris, Barcelona, which you would rather display vertically, like this:

Chicago
Paris
Barcelona

To make the list vertical, in the Data Values section, do the following:
Deselect Encode Data Values that URLs Do Not Support
Select Allow Multiple Values via URL Parameters.
Type %0a in the Value Delimiter text box to add line breaks between each item in the list. (These are the URL-encoded characters for a line break.)

Using field and filter values in URLs

When users trigger URL actions from selected marks, Tableau can send field, filter, and parameter values as variables in the URL. For example, if a URL action links to a mapping website, you could insert the address field to automatically open the currently selected address on the website.

1. In the Edit URL Action dialog box, begin typing the URL for the link.
2. Place the cursor where you want to insert a field, parameter, or filter value.
3. Click the Insert menu to the right of the text box and select the field, parameter, or filter you want to insert. The variable appears within angle brackets. You can continue adding as many variables as you need.

Note: Any referenced fields must be used in the view. Otherwise, the link won’t display in the viz, even if it functions when you click Test Link.
Including aggregated fields

The list of available fields includes only non-aggregated fields. To use aggregated field values as link parameters, first create a related calculated field, and add that field to the view. (If you don’t need the calculated field in the visualization, drag it to Detail on the Marks card.)

Inserting parameter values

When inserting parameter values, URL actions send the Display As value by default. To instead send the actual value, add the characters ~na after the parameter name.

For example, say you have a parameter that includes IP addresses, with Actual Value strings such as 10.1.1.195 and Display As strings with more friendly values such as Computer A (10.1.1.195). To send the actual value, you’d revise the parameter in the URL to look like this: http://<IPAddress-na>/page.htm.
Create a Subscription to a View or Workbook

Subscriptions email you an image or PDF snapshot of a view or workbook at regular intervals—without requiring you to sign in to Tableau Server or Tableau Online.

**Note:** In Tableau Server, administrators determine whether subscriptions are turned on for a site.

If Tableau Catalog is turned on for a site, administrators can also determine whether subscription emails include relevant upstream data quality warnings.

Tableau Catalog is available as part of the Data Management offering for Tableau Server and Tableau Online. For more information, see "About Tableau Catalog" in the [Tableau Server](https://help.tableau.com/current-server/en-us/server installation_and_deployment.htm) or [Tableau Online Help](https://help.tableau.com/current-online/en-us/help.htm).

Set up a subscription for yourself or others

When you open a view in Tableau Server or Tableau Online, if you see a subscription icon (posable image) in the toolbar, you can subscribe to that view or to the entire workbook. You can subscribe other users who have permission to view the content if you own a workbook, if you are a project leader with an appropriate site role, or if you are an administrator.

**Note:** Data refresh-initiated subscription emails are not supported for views or workbooks that rely on data sources that use Bridge to keep data fresh.

1. From the Explore section of your site, select **All Workbooks** or **All Views**, or open the project that contains the view you want to subscribe to.
2. Open a view either directly, or after opening the containing workbook.

3. On the view toolbar, select **Watch > Subscriptions**.

4. Add the Tableau users or groups you want to receive the subscription. To receive a subscription, users must have the View and Download Image/PDF permissions. If they use Tableau Server, their accounts must also have email addresses.
If you own the workbook, select **Subscribe me**.

**Note:** When you subscribe a group, each user is added individually at the time the subscription is created. If more users are added to the group later, you must re-subscribe the group for those new users to receive the subscription. Likewise, users later removed from the group will not have their subscriptions removed automatically unless their permissions to the subscribed view are removed.

5. Choose whether subscription emails include the current view or the entire workbook. If the view contains data only when high-priority information exists, select **Don't send if view is empty**.

6. Choose the format for your snapshot: as a PNG image, a PDF attachment, or both.
   - If PDFs, choose the paper size and orientation you'd like to receive.

7. To clarify subscription emails, customize the subject line, and add a message.

8. When the workbook uses one data extract on a published connection, you can pick a frequency:
   - **When Data Refreshes**: sends only when data in the view or workbook is refreshed by running refresh schedules.
   - **On Selected Schedule**: Pick a schedule for the subscription.

9. If frequency is not set to When Data Refreshes, pick a schedule:
For Tableau Server, choose from subscription schedules established by your administrator.

For Tableau Online and Tableau Server with custom schedules enabled, click the drop-down arrow to the left of the current settings.

Then specify a custom schedule that sends subscription emails whenever you wish. (The precise delivery time may vary if server load is high.)

To change the time zone, click the Time Zone link to go to your account settings page.

10. Click **Subscribe**.

When you receive a subscription email, you can select the image (or the link in the message body for PDF subscriptions) to be taken to the view or workbook in Tableau Online or Tableau Server.

**Update or unsubscribe from a subscription**

You can unsubscribe from an existing subscription, or make changes to a subscription’s format, schedule, subject, or empty view mode.
1. Access your Tableau Server or Tableau Online account settings by doing one of the following:

   - Click **Manage my subscriptions** at the bottom of a subscription email.

   - Sign in to Tableau Server or Tableau Online. At the top of the page, select your
user icon, and then select **My Content**.

2. Click **Subscriptions**.

3. Select the check box next to the view you want to unsubscribe from, click **Actions**, and then click **Unsubscribe**, or select the subscription option you’d like to change.

**Resume or delete suspended subscriptions**

 Sometimes, subscriptions fail because of an issue with the workbook or a problem loading the view. If a subscription fails more than five times, you’ll receive a notification email that your subscription has been suspended. There are a few ways to resume a suspended subscription if you’re a subscription owner or administrator:

- From the My Content area of Tableau web pages, an icon appears in the Last update column to indicate that the subscription is suspended. Select ... > **Resume Subscription** to resume.

- From the Subscriptions tab of the affected workbook, an icon appears in the last update column to indicate that the subscription is suspended. Select ... > **Resume Subscription** to resume.

You’ll receive an email notification when the subscription is working again.

**See also**

*Change subscription settings* in the Tableau Desktop and Web Authoring Help.
Project-level administration in the Tableau Online Help, to learn which site roles allow full Project Leader capabilities.

View Acceleration

View Acceleration loads views faster by precomputing and fetching the workbook's data in a background process. There are two potential bottlenecks when loading a view:

1. Querying (fetching data from the data source).
2. Rendering (creating the visuals, such as drawing shapes or rendering a map).

The time it takes to load a workbook depends on the combined time it takes to do these two steps. However, not all views can be accelerated. View Acceleration improves the performance of the query step, so a workbook performance won't improve significantly if its query step is already fast and there isn't a performance bottleneck on load.

In addition, View Acceleration relies on precomputation. The following factors impact the effectiveness of View Acceleration:

- A view uses transient functions, such as now() or today().
- A view relies on user-based functions to provide different results for different users. Even though Tableau Server could precompute results for all users, doing so significantly increases CPU, memory, and storage usage.
- A view has an extract refresh schedule that exceeds the daily limit. Accelerated views are regenerated when the extract is refreshed. To limit resource consumption, we limit the maximum number of jobs that can be run (6 per day).
- A view uses a published data source that exceeds the maximum number of daily extract refreshes (6 per day). This limitation applies to Tableau Online only.
- A view’s owner is inactive. Acceleration jobs run on behalf of the view owner. If the owner is inactive, then the job fails.
- A view can’t be loaded because the embedded credentials expired or the data source was deleted.

When users create custom views on top of an existing view and accelerate the custom view, both the original view and the custom view are accelerated. However, if a custom view hasn’t been accessed in the last 14 days, then the custom view can’t be accelerated. Finally, in
addition to the original view, up to 10 custom views can be accelerated for each original view.

**Note:** View Acceleration isn’t available in Tableau Desktop.

**Accelerate your view**

1. Sign in to a site on Tableau Online or Tableau Server.
2. From the Home or Explore page, navigate to the view you want to accelerate.
3. Click the **Accelerate** icon, and toggle the switch to **Accelerate**.

You can also accelerate views from the workbook page:
Understand why View Acceleration is unavailable

There are a few reasons that acceleration isn’t available for a view. Acceleration pre-computes long-running queries, so accelerated workbooks load faster. But if the view is already loading as fast as it can, then acceleration isn’t available because acceleration won’t significantly improve the performance of the view.

Similarly, if you use a data freshness policy that is less than 4 hours, then acceleration isn’t available because the cost is high for accelerating the views that are refreshed so frequently, and Tableau doesn’t want to overload your site performance. For more information, see Set a Data Freshness Policy.

If your administrator has suspended acceleration for your view, then contact your Tableau administrator to activate acceleration for your view. Similarly, if the site has reached the limit for the number of views that can be accelerated for your site, then contact your Tableau administrator.

To precompute the data, Tableau needs to connect to the data source in the background without requiring user interaction. Therefore, View Acceleration is only supported for workbooks with embedded connection credentials. And finally, views that use encrypted extracts can’t be accelerated because Tableau can’t access or accelerate an encrypted data source extract.
Allow View Acceleration on your site

Workbooks are not enabled for acceleration by default.

1. Sign into your site on Tableau Online.
2. From the left pane, choose Settings.
3. From the General tab, scroll to the View Acceleration section.
4. Check the box to allow creators and explorers to accelerate views in their workbooks.

Automatically suspend acceleration to save resources

To conserve resources, administrators can automatically suspend acceleration for views that are consistently failing. Administrators can set a threshold for the number of times an acceleration task can fail per day, week, or month before the acceleration is automatically suspended.

1. Sign into your Tableau site.
2. From the left pane, choose Settings.
3. From the General tab, scroll to the View Acceleration section.
4. Set the maximum number of failures allowed per day, week, or month.
5. Click Save.

View and manage accelerated workbooks

1. Sign into your Tableau site.
2. From the left pane, choose Tasks.
3. Click the Accelerated Views tab.
4. Choose the Actions menu (...) to Resume or Suspend Acceleration for the selected view or views.
Understand user Context for Precomputation

Precomputation for accelerated workbooks is performed with the user context of only one user. This user is either:

- The owner of the workbook (if there are no user filters in the workbook or data source, or if there are user filters on the data source but the data source is a published data source).
- or-
- The user that was selected for thumbnail generation the last time the workbook was published (if there are user filters on the workbook and the data source is not a published data source).

Publish Views to Salesforce (Limited Preview)

Bring your views from Tableau Online right to your Salesforce ecosystem by publishing views to a CRM Analytics app or Salesforce Lightning page.

Tip: Publishing to Salesforce is available exclusively to customers participating in a limited preview.
Prerequisites

1. You must have an Explorer (can publish) role.
3. You must configure a custom Salesforce OAuth client.

Publish a view to Salesforce

Select one or more views, including dashboards, sheets, and stories. Then, choose a destination from a list of CRM Analytics apps that you have access to edit or manage.

1. Select the view that you want to publish to Salesforce.

   **Note:** You can select a maximum of 25 views at a time to publish to Salesforce.

2. For **Actions**, select **Publish to Salesforce**.
3. Select the Salesforce credentials that you want to use for publishing.
4. Select the destination app that you want to publish to. You can only see apps that you can edit or manage with the signed-in Salesforce user.
5. Click **Publish**.

**Connected app session timeout**

By default, the timeout value for the connected app is 1 hour. If you want to publish views to Salesforce after your initial session expires, you must re-authenticate.

You can choose to extend the timeout value for your connected apps to a maximum of 24 hours.

1. First, update the session policy **Timeout Value** for the connected app. For instructions, see Manage Session Policies for a Connected App.
2. Then, configure the session security timeout settings. Update the **Timeout Value** to match the value that you entered for the connected app session policy. For instructions, see the Configure Session Timeout Settings section of Modify Session Security Settings.
Who can see the published view in Salesforce?

When you publish a view to Salesforce, anyone with access to the selected CRM Analytics app or Lightning page can see that the content exists. However, only those signed in with existing Tableau permissions can see the view.

Interact with Data in Tableau

This tutorial walks you through some of the basics of viewing and interacting with data visualizations, or views, in Tableau Server.

Tableau is a tool that lets you interact with published visualizations to explore insights, ask questions, and stay on top of your data. Here’s how to get started.

Go ahead. It’s safe to click around

Tableau is built for interaction. What you do to a visualization changes how it looks for you, just for now.

Others will still see the visualization as it originally appeared. And the data used to build it stays the same, too.

1: What is a Tableau Site?

A Tableau Site is a place for your team to share data and data visualizations with each other. You can explore what they’ve published and made available to you.

When you sign in to your Tableau site, you’ll land on the home page.
2: Search for a viz

Tableau calls visualizations on a site Views. Use search to find views or workbooks (a package of views in a single file).

Search results will show all the different content types relevant to your query.
You can select See All for all search results if the views in the quick search aren’t what you were looking for, or use the Explore page to browse. There you'll see all the different types of content a Tableau site can host.
3: Interact with Content

A published view is a canvas for you to interact and understand your data. Remember, you won't hurt or change the underlying data, or change what others see.

Here are some of the tools in your toolbox to find data insights.

See Details and Sort Data

Now that you know you can click on the data, let's check it out.

As you move the mouse across a view, you might see tooltips that reveal details about each data point, or mark. You can also select multiple marks.

Sort tables alphabetically or numerically by hovering over a column header and clicking the sort icon.
Filter Data

Trim or limit the visible data to a specific area, date, or category.
Undo/Revert

Maybe you didn’t mean to exclude everything but one area. Click Undo to remove the last change, or use Revert to undo all your selections.

<table>
<thead>
<tr>
<th></th>
<th>Count of Customers</th>
<th>Sales</th>
<th>Quantity</th>
<th>Sales per Customer</th>
<th>Profit</th>
<th>Profit Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>132</td>
<td>$50,540</td>
<td>611</td>
<td>$383</td>
<td>$2,489</td>
<td>4.9%</td>
</tr>
<tr>
<td>East</td>
<td>96</td>
<td>$43,034</td>
<td>447</td>
<td>$448</td>
<td>$911</td>
<td>2.1%</td>
</tr>
<tr>
<td>South</td>
<td>60</td>
<td>$30,534</td>
<td>280</td>
<td>$509</td>
<td>$890</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

4: Keep up

This view can automatically update with new data, so you don’t need to go searching for new charts to get the latest information. Keep it handy by clicking the star icon to add it to your favorites.

All favorites are added to the Favorites page in the navigation panel. And any recent dashboard or view you explored also appears in the Home page, waiting for you next time.
There's a lot you can do in Tableau Server, and this just explored some of the basics. For more information, see What Can I Do with a Tableau Web View?

Happy exploring!

Create and Troubleshoot Metrics

Metrics provide a fast way to stay informed about your data. Because metrics update automatically and display their current value in the grid and list view of your content, you can check all the key numbers you care about in seconds.
At their most basic level, metrics show the value of an aggregate measure, like the sum of sales. More complex metrics can include timelines, comparisons, and statuses that provide an easy to understand indicator of how you’re performing relative to a prior point in time or a value you have defined.

If you have a set of dashboards that you regularly check, create metrics for the numbers that you want to monitor, then track them in one place by adding them to your favorites or a collection, or by creating them in the same project. That way, you don’t need to load and filter the dashboards unless you want to dig deeper into your data.

**Find metrics on your site**

There are a few ways to find metrics on your Tableau site. To browse all the metrics that you have permission to view, navigate to the Explore page, then select All Metrics from the content type menu.

If you’re looking for metrics related to a particular view or workbook, check the connected metrics for that content. To see connected metrics for a view, open the view, then click **Watch > Metrics** in the view toolbar. The metrics displayed are ordered from the newest creation date to the oldest.
To see connected metrics for all the views in a workbook, navigate to the workbook, then click the **Connected Metrics** tab. You can sort these metrics using the Sort By menu.
Components of a metric

The only data required to define a metric is an aggregate measure. Metrics are created from a mark in a view, and the measure associated with that mark defines the metric. The measure must be aggregated, because an unaggregated mark will not change over time. For information about dimensions and measures in Tableau, see Dimensions and Measures, Blue and Green.

A metric can optionally be defined by a date dimension, and you can configure a comparison and a status for your metric. Each of these components will add context to the data presented on the metric card.

Metrics that have only a measure defining them will appear as a single number. This number will update when the data updates, but there will be no timeline on the card.
Timeline

When you select a mark to define a metric, if the mark has a date dimension associated with it, that dimension becomes part of the metric definition. Metrics with a date dimension show a timeline, and you can configure the historical comparison for the metric. By default, the historical comparison is to the previous mark.

When you open a metric’s details page, the timeline shows the value of the measure based on the granularity of the date dimension, for example, daily sales or monthly users. Hover over the points on the timeline to see historical values.
Comparison

There are two types of comparisons that you can configure for metrics: historical comparisons and constant comparisons. You can configure a historical comparison only if a metric has a date dimension associated with it, but constant comparisons can be added for any type of metric.

A historical comparison is a relative comparison between the current value and a specified number of hours, days, or other unit of time previous. For example, you could set a comparison between the current value for monthly sales and the value from 12 months ago.
Every time data is added to a metric, the historical comparison will adjust relative to the date or time of the new data.

Constant comparisons are to a single value that doesn’t change as new data is added. You might set a comparison to represent a threshold to stay above, for example, if you need to maintain a 90% on-time delivery rate. Or you might define a cumulative goal you are working toward, for example, a monthly sales target.
Status

For metrics with a constant comparison, you can define whether being above, below, or at the comparison value is good, bad, or neutral. A metric with a “good” status will display a check mark next to the comparison value, and the metric card will have a green band at the top. A metric with a “bad” status will display an X next to the comparison value, and the metric card will have a red band at the top. Metrics with a “neutral” status appear the same as metrics without a status indicator; there is no icon or color applied to the card.
Create a metric from a view

If you have a site role of Creator or Explorer (can publish), and you have the Create/Refresh Metric capability on the relevant workbook, you can create metrics on Tableau Online or Tableau Server.

Before you create a metric, check the connected metrics for the view to make sure that the metric you are planning to create doesn't already exist. Instead of creating a duplicate metric, open the existing metric and add it as a favorite.

Select the mark to define your metric

1. Navigate to the view that you want to create a metric from.

2. On the view toolbar, select Watch > Metrics.

![Image of the metrics pane]

The metrics pane opens.

3. If the pane shows connected metrics, select the Create button to enter authoring mode.

4. Select a mark. If you encounter an error, see When you can’t create a metric.
The measure associated with this mark defines your metric. Any filters you apply to the mark are applied to your metric. If this mark has a date dimension associated with it, that date dimension also defines your metric, and your metric will display a timeline.

The metrics pane shows a preview of your metric. The value in the preview is the most recent value for the metric, which may differ from the value of the mark you selected if it was not the most recent in the time series. The preview updates as you try different configurations.

Describe and configure your metric

The options available to configure your metric depend on the mark you select and on the type of comparison you choose.
1. The **Name** field is pre-populated based on the mark you select. You can give the metric a different name. A metric must have a unique name within the project it belongs to.

2. Under **Description**, enter an optional message to help others understand your metric. For example, describe filters applied to the metric or indicate the data source used by the metric.

3. For the **Date Range** (only for metrics with a date dimension), select one of the default options, or set a custom range. If your metric has a large number of marks, limiting the date range can make it easier to read the timeline.

4. Select the **Comparison Type** for the metric: historical or constant.

5. For **Historical** comparisons:
   - Enter how far prior you want to compare against. The unit of time for the comparison is the same as the granularity of your data, such as hours or months.
   - Select **Show Comparison Line** to include a second line for the comparison period on the timeline.

6. For **Constant** comparisons:
   - Enter the value to compare against. Don’t include commas or symbols in this field. To enter a percentage, simply type the number without the percent sign, for example, enter 25 instead of 0.25 for a target of 25%. When you enter a valid target value, the preview updates to show how far above or below the target the current value is.
   - Set the **Status** for the comparison to indicate whether being above, at, or below the value is good, bad, or neutral. By default, the status is set to neutral. Check the metric preview to see how different statuses affect your metric.

7. Under **Definition > Measure**, select the measure to use for your definition from the drop-down. This option appears only if the mark you select has more than one measure associated with it.
Finalize your metric

1. Under **Project**, select **Change Location** to choose a different project for the metric. By default, your metric will be added to the same project that the view belongs to.

   Every metric in a project must have a unique name. Because a metric's name and project are initially set based on the mark you select, you might run into a conflict when you try to save your metric, if another user has already created a metric from that mark. Either choose a different project or name for your metric or, if you want to overwrite the existing metric, see [Overwrite a metric](#).

2. Click the **Create** button.

   A message appears with a link to the metric in the project you added it to.

   ![Success: Metric "Profit" created in project "Metrics". Go to Metric](image)

3. Verify that the permissions for your metric are correct, following the guidance in [Set permissions](#).

   By default, a metric inherits the permissions of the project it is created in. Anyone with access to your metric will be able to see the metric's data, even if they don't have permission to access the connected view or data source.

Now that you've created a metric, you can manage the metric the same way you manage other independent pieces of content on your Tableau site. Though metrics are created from a view, they exist independently of that view, unlike data driven alerts or subscriptions. You
can move the metric to a different project without moving the connected view. For information about managing content on your Tableau site, see Manage Web Content.

Overwrite a metric

Once a metric is created, you can change the name, description, and configuration of the metric, but you can’t change how the metric is defined. If you want to change the data that the metric uses, you must overwrite it. In order to overwrite a metric, you need to be the metric owner or be granted the correct permission capability.

1. To overwrite a metric, create a metric with the same name in the same project as the metric you want to overwrite.

   The Overwrite Metric dialog appears.

2. Click the Overwrite button.

When you overwrite a metric, the metric continues to appear for those who have added it to their favorites, and any changes made to permissions for the previous metric will apply to the new metric.

When you can’t create a metric

If you select a mark on a chart that doesn’t support metrics, you’ll get an error message explaining why you can’t create a metric. The table below summarizes these scenarios.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>You don’t have the correct permissions.</td>
<td>• The workbook owner or an administrator has denied the Create/Refresh Metric capability. For more information, see Permissions.</td>
</tr>
<tr>
<td>You can’t access the complete data.</td>
<td>• Row level security or user filters limit the data you can see. For more information, see Restrict Access at the Data Row Level.</td>
</tr>
<tr>
<td></td>
<td>• The workbook uses a virtual connection to connect to the data. For more information, see About Vir-</td>
</tr>
</tbody>
</table>
### Reason

<table>
<thead>
<tr>
<th>Reason</th>
<th>Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>The password for the workbook's data source is not embedded or is no</td>
<td>• The workbook prompts for a password. For more information, see Set</td>
</tr>
<tr>
<td>longer valid.</td>
<td>Credentials for Accessing Your Published Data.</td>
</tr>
<tr>
<td>The data isn't at the correct level of granularity.</td>
<td>• The data in the chart isn't aggregated. Metrics use aggregations,</td>
</tr>
<tr>
<td></td>
<td>such as sum or average. For more information, see Data Aggregation in</td>
</tr>
<tr>
<td></td>
<td>Tableau.</td>
</tr>
<tr>
<td></td>
<td>• There are multiple values per cell of data—a result of data blending.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Troubleshoot Data Blending.</td>
</tr>
<tr>
<td>The date dimension is not supported.</td>
<td>• The chart includes both date parts and date values. For more information,</td>
</tr>
<tr>
<td></td>
<td>see Change Date Levels.</td>
</tr>
<tr>
<td></td>
<td>• The date dimension uses the ISO 8601 calendar rather than the standard</td>
</tr>
<tr>
<td></td>
<td>Gregorian calendar. For more information, see ISO-8601 Week-Based</td>
</tr>
<tr>
<td></td>
<td>Calendar.</td>
</tr>
<tr>
<td></td>
<td>• The date dimension is aggregated at the custom level of Month / Year or</td>
</tr>
<tr>
<td></td>
<td>Month / Day / Year. For more information, see Custom Dates.</td>
</tr>
</tbody>
</table>

### Edit a metric's configuration

Starting in 2022.2, you can change the configuration for a metric. A metric's configuration includes the comparison, date range, and status indicator. The configuration options available depend on the type of metric. Metrics with a timeline allow you to set a historical comparison or a constant comparison. Single number metric support only a constant comparison.
A metric’s configuration does not include the metric definition (the measure and date dimension that generate the metric value). If you want to change the definition, overwrite the metric with a new metric.

To edit a metric’s configuration, you must have the overwrite capability for the metric.

1. Open the metric details page for the metric you want to edit.
2. Mouse over the configuration section. Click anywhere on the section to enter editing mode.
3. For a timeline metric, set the date range to display on the metric card and details.
4. Select the comparison type. For a constant comparison, set a comparison value and status. For a historical comparison, set how far prior you want to compare against and choose whether to show a comparison line on the timeline.
5. Click Save. Your configuration changes will appear to anyone who views the metric.

How metrics refresh

When a metric refreshes, it checks the connected view (the view the metric was created from) for new data. A refresh doesn’t necessarily update the value of a metric, because there may be no changes to the data.

Metrics refresh at a frequency either based on an extract’s refresh schedule or, for live data, every 60 minutes. The time of the last refresh is displayed on the metric.
Fix failing refreshes

If a metric isn’t able to access the connected view or its underlying data, the refresh will fail. If the refresh for your metric fails, you’ll receive a notification, which notes the time of the failure and the affected metric.

Metric refreshes may fail for one of the following reasons.

- The connected view was deleted or modified.
- Permissions changed for the connected view.
- The password for the data source is no longer embedded or is no longer valid.
- The metric owner doesn’t have the required site role to refresh the metric. A site role of Creator or Explorer (can publish) is required.
- There was a temporary connectivity issue, which will resolve itself.

To identify the cause of the failure, look at the metric details. Make sure that the metric owner has the required site role to refresh the metric. Then inspect the Connected View.
If the connected view is still listed

Open the view to investigate the cause of the failure.

If the view loads, check that the measure and (optional) date dimension that define the metric are still present in the view.

- If the view appears to be unchanged, you might no longer have permission to refresh metrics from it. The content owner or a Tableau administrator can change the Create/Refresh Metric permission capability. For more information, see Permissions.

- If the measure is no longer present, the view has been modified so the metric can’t connect to the data needed to refresh. The content owner or a Tableau administrator
Tableau Online Help

can check the revision history and restore previous versions. For more information, see View Revision History.

If the view doesn’t load, but instead prompts for a password or displays an error when connecting to the data source, the password for the data source is not embedded or is no longer valid. The content owner or a Tableau administrator can edit the data source connection to embed the password. For more information, see Edit Connections.

If there is no connected view listed

The view was deleted or you no longer have permission to access the view. Contact your Tableau administrator for assistance.

Resume suspended refreshes

If a refresh fails enough times, the refresh is suspended. You’ll receive a notification if the refresh for your metric is suspended.

When a metric refresh is suspended, Tableau no longer attempts to get new data for the metric. Metrics with suspended refreshes continue to present historical data.

If the cause of the failure is fixed, you can resume the refresh.

1. Open the affected metric.
2. On the warning message, click Resume refresh.

Tableau attempts to perform the refresh. If this attempt succeeds, you’ll receive a notification, and the refresh will resume on schedule. If the attempt doesn’t succeed, your refresh remains suspended.

Try overwriting the metric if the connected view is still available. For more information, see Overwrite a metric. Otherwise, you can keep the metric to reference past data or delete the metric.
Note: If the metric refresh is suspended because you don’t have the required site role for it to refresh, you won’t be able to resume the refresh or delete the metric.

Metrics appear in Tableau Catalog

Starting in 2019.3, Tableau Catalog is available with Data Management in Tableau Online and Tableau Server. When the Tableau Catalog is enabled in your environment, you can see metrics in the Catalog lineage tool, and metrics affected by data quality warnings display those warnings. For more information about Tableau Catalog, see "About Tableau Catalog" in the Tableau Server or Tableau Online Help.

When you have metrics defined for the numbers you want to monitor, it’s important to know if the data that the metrics rely on are impacted in any way. You can use Catalog in a couple of ways to know this. First, data quality warnings set on the data your metric is based on show on the metric. These warnings appear when you open a metric in Tableau Mobile, and in Tableau Server and Tableau Online when you hover over a metric in grid view and on the metric details page, as shown below:
For more information, see "Set a Data Quality Warning" in the Tableau Server or Tableau Online Help.

You can also use the lineage tool in Tableau Catalog to see the upstream sources that your metric relies on. When doing an impact analysis, you can see which metrics are affected if a certain column or a table is changed or deprecated, or if certain workbooks are removed. Including metrics in the lineage means that Catalog gives a full picture of the impact changes can have on the assets in your environment.
For more information, see "Use Lineage for Impact Analysis" in the Tableau Server or Tableau Online Help.

Set a Data Freshness Policy

Understand data performance and freshness

You’ve built your workbook, and your team loves it. But sometimes people need to click the Refresh button for the most up-to-date data to appear in the viz. You built the workbook using a live connection, so why does the data need to be refreshed? The answer is performance.

To improve performance, Tableau caches data so subsequent visits can reuse and return that cached data faster. You can click the Refresh button to retrieve updated data, but this can add to potential performance costs.
To balance data performance and freshness, set a data freshness policy for your workbook. When you set a data freshness policy, your data is refreshed at the time you specify. Tableau won’t visualize cached data that doesn’t meet the freshness policy you’ve set.

Choose what’s best for your workbook

Some people might not want caching so that they always have the freshest data, while other people might want large caches to reduce overhead and improve workbook performance. The first step in setting a data freshness policy is to decide what’s right for your business.

Tableau Online refreshes cached data every 12 hours by default, and workbook owners can set data freshness policies at the workbook level.

In Tableau Server, server administrators can set a default caching policy for all sites on the server, and workbook owners can set data freshness policies at the workbook level.

Note: Data freshness policies aren’t available in Tableau Desktop or for workbooks that use file-based data sources.

Edit a workbook data freshness policy

To edit a workbook data freshness policy, you must be the workbook owner, and the workbook must have a live connection to the data source.

1. Sign in to a site on Tableau Online or Tableau Server.
2. From the Home or Explore page, navigate to the workbook you want to set a policy for.
3. Click the details icon.
4. From the Workbook Details dialog, click Edit Data Freshness Policy.
5. Choose one of the following options:
   - Site default (12 hours)
   - Always live (Tableau will always get the latest data)
   - Ensure data is fresh every
   - Ensure data is fresh at
6. Click OK.
Site default refreshes your data every 12 hours, which is a great option if your audience regularly uses your dashboard, but doesn’t need up-to-the-minute data freshness.

Always live provides the freshest data at all times, which can increase loading time.

Ensure data is fresh every... allows you to specify how often data is refreshed with the granularity of minutes, hours, days, or weeks.

Ensure data is fresh at... allows you to schedule the time and day for data refreshes. If you have an important meeting every Monday, Wednesday, and Friday at 09:00 AM Pacific time, then you can set your data refresh to occur at 08:45 AM every Monday, Wednesday, and Friday, so you have the freshest data when your meeting starts.
Workbook Optimizer

The Workbook Optimizer is a tool that identifies if a workbook follows certain performance best practices. These guidelines are limited to what can be parsed from the workbook’s metadata and evaluated by a rules engine algorithm. Not all of its recommendations are applicable to or appropriate for every workbook. There are many aspects of performance that aren’t captured by the Optimizer, some of which can offer easy wins. For more information, refer to Streamline your workbook and the whitepaper Designing Efficient Production Workbooks.

Run the Workbook Optimizer

The Workbook Optimizer is available from the publishing dialog.

1. From the File menu, select Publish or Publish As.
2. Click Run Optimizer. This opens a new dialog for the Workbook Optimizer.
3. The workbook is automatically evaluated against the guidelines and results display in one of three categories: Take Action, Needs Review, or Passed.

- You may see fewer than three categories. (If no guidelines fall into a category, it won’t display.)
Expand each category to see the guidelines. You can also expand each guideline for more information about why it’s a recommendation. Some have additional information specific to your workbook:
You can choose to address any or none of the guidelines. As running the Optimizer is a voluntary step in the publishing process, it won’t prevent you from being able to publish.

4. To close the dialog and go back to the workbook, click Close.
5. To close the dialog and go back to the publishing dialog, click Publish.

Optimizer categories

The Optimizer breaks down its guidelines into three categories: take action, needs review, and passed.

Take action indicates that updating the workbook to follow these best practices should have minimal to no impact on the functionality of the workbook. There’s probably no reason to avoid making these changes.

Needs review indicates that following these best practices may involve modifying the workbook in more involved ways, such as restructuring a data source or simplifying a dashboard.
For these guidelines, use your best judgment to determine what is possible or practical to address.

Some recommendations may involve a lot of effort for minimal performance gain and won’t be worth it.

It may be useful to use the Performance Recorder to get a performance benchmark.

Some may be deliberate choices you’ve made.

As the author, you’re the final authority on what makes a workbook as efficient as possible.

*Remember that some best practices should be broken to effectively deliver content.* Always weigh the goal of the workbook against changes to improve performance.

**Passed** indicates the guidelines are met and the workbook is already following best practices in that area. But remember, there are many aspects of performance that aren’t captured by the Optimizer.

### The guidelines

Every guideline contains a “consider” statement that suggests a potential way to address the performance impact. These are necessarily general and may not apply in every situation. These suggestions are a starting point only; always frame your decisions in the context of your environment and the goals of your workbook.

**Note:** Not all suggestions are possible to perform in the browser and may require editing in Tableau Desktop instead.

## Calculation length

**Sample output message:** The calculation **My calculation** is 600 characters long.

Computing the results of complex calculations can impact performance.
Consider breaking the calculation apart and moving whatever is possible to the database, or using Tableau Prep to create the calculations prior to analysis.

Additional information

Complex and long calculations can either be written in a single calculation or nested, with components written as standalone calculations and used in another calculation. Building a calculation with nested components may make it easier to troubleshoot and maintain, but it can add complications and additional processing. If possible, pushing these components back to the data source may aid performance.

Comments in calculations count against the length, so this guideline may be triggered by a long comment rather than a long and complex calculation.

Calculation uses multiple data sources

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** includes 17 calculations using fields from another data source.

When calculations use fields from multiple data sources, Tableau can’t use any optimizations and must compute the calculation locally.

Consider using Tableau Prep to create the calculation and using an extract.

Additional information

By moving the cross-database calculation to the data layer, the processing can be performed before the user even requests the dashboard. See Join your data (Prep) and Create level of detail and rank calculations for more information.

Under some conditions a parameter may trigger this guideline. If a calculation is indicated that doesn’t use multiple data sources, check to see if it has a parameter and if that parameter can be simplified.
Dashboard size not fixed

From the Workbook Optimizer

*Sample output message:* The dashboard **Q3 analytics** isn’t fixed size.

Fixed sized dashboards can be cached because they’re a predictable size. Using automatic dashboard sizing means the results depend on the user’s screen, and therefore the dashboard must be rendered every time. Rendering dashboards more often comes with a performance hit.

Consider using fixed dashboard sizing.

Additional information

Although responsive elements are a best practice in web design, letting your dashboard resize can distort the layout of the content in addition to the performance impact of re-rendering. For Tableau visualizations, it’s best to use a **fixed dashboard size** and use **device-specific dashboards** to support different devices and screen sizes.

Filter uses conditional logic

From the Workbook Optimizer

*Sample output message:* The filter **Sample Type** uses conditional logic.

Dimension filtering can be done in various ways, such as on a list of values, by wildcard matching, or using conditional logic. Conditional logic can be slow.

Consider changing the filter to not use conditional logic. If necessary, make sure your logic tests for the most frequent outcome first and use ELSEIF or CASE when possible.

Additional information

For more information on filtering, see **Filter Your Data.**
Filter uses "Only Relevant Values"

From the Workbook Optimizer

Sample output message: The filter Sample Type uses “Only Relevant Values”.

When a filter uses “Only Relevant Values”, the interactive filter control only shows options that are applicable given the current state of the view. Every time a change is made to other filters, the list of values to be displayed must be requiered, which has a performance impact.

Consider using dashboard filter actions instead. If the end-user benefit is valuable enough that this feature should be used, consider extracting the data and optimizing the extract.

Additional information

There are situations where using “Only Relevant Values” is necessary to avoid an unwieldy filter list. Instead of using interactive filters in that situation, try using action filters. For example, consider a dashboard that has cascading filters for Category, Sub-Category, and Product ID, where Product ID is set to Only Relevant Values. Removing that restriction would expand the list of products significantly. Rather than using filters, you can build simple visualizations (such as a bar chart of Category and Sub-Category) and use it as a filter. The user clicks on a bar and the action filter is applied to the rest of the visualizations on the dashboard. For more information, see Dashboard Actions.

Live data connections

From the Workbook Optimizer

Sample output message: The data source Supply Chain isn’t an extract.

Tableau extracts are designed to be as efficient as possible for use with analytics. Using extracts is one of the easiest ways to improve performance due to the data source. Extracts also have many native features for optimization.

Consider extracting the data source.
Additional information

In some instances, taking an extract may put undesirable strain on the Tableau Server or Tableau Site’s resources. Work with your Tableau administrator to determine the best course of action.

The whitepaper Designing Efficient Workbooks has extensive information about extracts and how to use them for performance. (You may must sign in to access the whitepaper.)

Multiple connections in a data source

From the Workbook Optimizer

*Sample output message:* The data source Supply chain uses multiple data connections.

Data sources that include multiple connections can’t be computed locally.

Consider combining the data sources in Tableau Prep and using an extract for analysis.

Additional information

See Join your data (Prep) for more information.

Nested calculations

From the Workbook Optimizer

*Sample output message:* The calculation My Calculation references another calculation.

Nesting calculations can add complications and additional processing, especially with IF statements and other performance intensive functions.

Consider pushing the calculations to the data source or materialize them in an extract.

Additional information

For more information on materializing calculations in an extract (Compute Calculations Now), see Materialize Calculations in Your Extracts.
For more information about building calculations in Tableau Prep, see Calculations in Tableau Prep.

Non-materialized calculations

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** hasn’t been pre-computed.

Computing the results of a calculation can impact performance.

Consider pushing calculations to the data source when possible. If using an extract, materialize calculations to pre-compute their results.

Additional information

Pre-compute the data and calculations either in an extract or your back-end data source. By moving this additional processing to the data layer, the processing is completed before the user even requests the dashboard.

Taking an extract of your data often boosts performance, though there are tradeoffs in data freshness and some functionality. See Extract Your Data for more information about options for extracts and Materialize Calculations in Your Extracts for more information on materializing calculations.

Extract your data: right click on the data source’s name at the top of the Data pane and select **Extract Data**. In the configuration dialog, choose **Compute Calculations Now**.

Number of data sources

From the Workbook Optimizer

*Sample output message:* The workbook contains 17 data sources.

Each data source contributes to the amount of time Tableau spends loading and rendering a workbook.
Consider combining data sources if possible, especially when the level of granularity is the same or they support the same analysis.

Additional information

See Relate Your Data for more information on combining data sources, or consider using Tableau Prep.

However, be wary of over-combining data sources. Workbooks perform best when each type of analysis is built off a well-designed data source. If it’s hard to combine your data sources, this could be a sign that the analysis should be split into multiple workbooks, each with a more targeted purpose.

To split your analysis across multiple workbooks, try one of these methods:

- Save a copy of the workbook and delete unnecessary sheets, dashboards, and data sources from each one. See Streamline your workbook for more information.
- Copy specific sheets into a new workbook. This may be more efficient because copying a dashboard into a new workbook carries over only what is needed for that dashboard. However, not all formatting options are transferred. See Copying Information Between Workbooks for more information.

Number of filters

From the Workbook Optimizer

Sample output message: The sheet Classroom Distribution contains 17 filters.

Excessive filters on a view create a more complex query.

Consider reducing the number of filters and using filter actions wherever possible. Not all types and formats of filters are created equal in terms of performance, so consider optimizing necessary filters.

Additional information

The whitepaper Designing Efficient Production Workbooks has an entire section on filters that goes into much more detail. In brief:
Tableau Online Help

- Reduce the overall number of filters
- Filters applied to multiple worksheets trigger multiple queries with every change
- Limit use of **Show only relevant values**. Using an extract helps optimize this feature if it’s needed.
- Avoid high cardinality include/exclude filters
- Use the **Apply** button to prevent multiple refreshes as the user interacts with the filter
- Filter on fields that are present in the view
- Use continuous date filters rather than discrete date filters
- Context filters shouldn’t be used purely to boost performance

Filter actions are an efficient way to guide the user through a dashboard. See [Filter Actions](#) for more information.

---

**Number of layout containers**

From the Workbook Optimizer

**Sample output message:** The dashboard **Q3 analytics** contains 42 layout containers.

Layout containers can complicate dashboard rendering.

Consider removing unnecessary layout containers and simplifying the dashboard design.

**Additional information**

For more information about layout containers and the Layout pane, see [Group items using layout containers](#).

---

**Number of LOD calculations**

From the Workbook Optimizer

**Sample output message:** The workbook contains 42 LOD calculations.

Computing the results of complex calculations can impact performance. Often, LODs are used on the fly to address issues of granularity in the data source that could be handled prior to analysis.
Consider tailoring the data source to the analysis to avoid the need for as many LODs.

Additional information

Level of Detail calculations are powerful tools, but they’re expensive. Make sure you’re only using them when necessary.

Production databases are designed to handle significant query loads and are a great option for moving processing out of Tableau. FIXED LOD calculations can sometimes be performed by the database. Tableau Prep also supports FIXED LOD calculations. See Create level of detail and rank calculations for more information.

Number of views in a dashboard

From the Workbook Optimizer

Sample output message: Dashboard Q3 analytics contains 17 views

A dashboard must load all elements before it can be displayed. The more views a dashboard contains, the longer it takes to load. Although it often involves a redesign, reducing the number of views in a dashboard is often the best way to boost its efficiency.

Consider streamlining the dashboard to be as effective and simple as possible by reducing the number of views, filters, and other elements. Start with anything can be removed immediately. See Streamline your workbook for other ways to reduce clutter in your dashboard

Additional information

If a more substantial redesign is needed, remember that not all views have an equal impact on performance. Focus on sheets with the most marks, filters, or other complexity. A good strategy can be to limit the initial dashboard to summary information and only provide more details when the user requests them. There are many strategies for this sort of guided drill-down, including:

- Use action filters. See Filter Actions for more information.
- Hide detailed views in a container using a layout container with a show/hide button. See Show and hide objects by clicking a button for more information.
Number of workbook sheets

From the Workbook Optimizer

Sample output message: The workbook contains 42 visible sheets

The overall size of a workbook impacts how long it takes to be processed and displayed. All visible sheets must be loaded before Tableau can display a workbook or view. Reducing the number of sheets can help speed up load time.

Consider reducing the number of sheets in the workbook by closing unneeded sheets, hiding sheets that are used in a dashboard, or splitting the analysis into multiple workbooks.

Additional information

Delete sheets that aren’t necessary for the analysis: right click on the sheet tab along the bottom of the workbook and select Delete.

Hide sheets in use: Worksheets used in a dashboard or story can’t be deleted, but they can be hidden. See Manage Sheets in Dashboards and Stories for more information.

  - Hide all of a dashboard’s sheets: right-click the dashboard tab at the bottom of the workbook and select Hide All Sheets.
  - Hide a specific sheet: right click the sheet tab at the bottom of the workbook and select Hide.

If all sheets are needed, decide if the analysis can be split into multiple workbooks, each with a more targeted purpose.

  - Save a copy of the workbook and delete unnecessary sheets, dashboards, and data sources from each one. See Streamline your workbook for more information.
  - Copy specific sheets into a new workbook. This may be more efficient because copying a dashboard into a new workbook carries over only what is needed for that dash-
board. However, not all formatting options are transferred. See Copying Information Between Workbooks for more information.

Unused data sources

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** isn’t used in the workbook.

Each data source contributes to the amount of time Tableau spends loading and rendering a workbook.

Consider closing data sources that aren’t in use.

Additional information

If any data sources aren’t being used, close them: right click on the data source’s name at the top of the Data pane and select **Close**.

Unused fields

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** contains 42 fields that aren’t being used.

Hiding unused fields prevents them from being unnecessarily queried and reduce the size of extracts.

Consider hiding any fields that aren’t being used, regardless of whether the data source is an extract.

Additional information

**Hide unused fields**

- In Tableau Desktop: open the dropdown menu at the top of the Data pane and select **Hide All Unused Fields**.
In web authoring: right click on an unused field and select **Hide**. There’s no way to bulk hide unused fields in web authoring. If hiding fields individually is prohibitive, consider editing in Tableau Desktop instead of working in the browser.

---

**Uses data blending**

From the Workbook Optimizer

*Sample output message:* The sheet **Classroom Distribution** uses data blending.

Data blending performance is driven by the number of unique members in the linking fields.

Consider using relationships when possible. If a blend is required, try to use low cardinality linking fields.

**Additional information**

There are several ways to combine data from multiple sources. **Data blending** sends two separate queries to two separate data sources and displays the results together in the viz. These queries are at the level of the linking fields and the results are merged in memory in Tableau. Large query results require more processing to generate the final viz.

**Tip:** If you aren’t using data blending but the Workbook Optimizer failed this rule, check if the workbook is using cross data source filtering. Filtering across data sources suffers from similar performance issues around field cardinality.

---

**Uses date calculations**

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** contains 17 date calculations.

Date logic can be complicated. Minimize the number of date calculations and conversion you have to do in Tableau.
Consider using DATEPARSE and MAKEDATE before other methods, and try to use built-in functions like DATEDIFF() when possible. If filtering on a date, use relative date filters or a continuous date filter instead of a discrete filter.

Additional information

Computing calculations in Tableau can have a significant performance impact, especially date functions. Consider taking an extract and materializing calculations, or pushing calculations to your data source. For more information about building calculations in Tableau Prep, see Create Calculations in Tableau Prep.

**Note:** If a date calculation is nested in another calculation, the Workbook Optimizer returns the name of the nested date calculation, even if the parent calculation is the field used in the viz.

---

**Uses grouping**

From the Workbook Optimizer

*Sample output message:* The data source **Supply Chain** uses 17 grouped fields

Tableau’s native grouping functionality loads the entire domain of the field, which can have a performance impact.

Consider using a calculated field with a CASE statement or sets instead of groups.

Additional information

In the testing performed for the Designing Efficient Workbooks whitepaper, grouping with CASE and sets performed better than the native group functionality.

The **CASE** function can be used to create groups. Imagine a scenario where the data involved a deck of cards. There’s a field for the card value (2–10, J, Q, K, A) but the analysis should compare face cards to number cards. The case statement to make that grouping could be
Tableau Online Help

```sql
CASE [Value]
    WHEN "J" THEN "Face card"
    WHEN "Q" THEN "Face card"
    WHEN "K" THEN "Face card"
    ELSE "Number card"
END
```

Sets have the added benefit of set actions, which make sets more powerful and flexible than traditional grouping. For more information, see Create Sets and Set Actions.
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.

- **Tableau Metadata API**—Using GraphQL, you can discover and query Tableau content and related external assets and metadata. For more information, see Tableau Metadata API.

- **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.
Notes for Tableau Online users

- When you make REST API calls to Tableau Online, you need to use the URL for the instance on which your site exists. For example, https://10ay.online.tableau.com/

  For information, see Specifying Resources for Tableau Online under Using URIs to Specify Resources.

- Not all of the methods provided in the Tableau REST API are applicable to Tableau Online. For information, see the API listing by category in the API Reference.

Go to the Developer Portal
About Data Management

Data Management is a collection of features and functionality that helps customers manage Tableau content and data assets in their Tableau Server or Tableau Online environment.

Starting in Tableau Server 2019.1, Tableau Prep Conductor is available for on-premise Tableau Server deployments, and in version 2019.3, Tableau Prep Conductor is available for Tableau Online deployments. You can use Tableau Prep Conductor to schedule and monitor flows.

Starting in Tableau 2019.3, Tableau Catalog is included in Data Management, making a variety of additional features available to you in the data management space. You can use Tableau Catalog to discover data, curate data assets, communicate data quality, perform impact analysis, and trace the lineage of data used in Tableau content.

Starting in Tableau 2021.4, more governance and security features are added to Data Management: virtual connections and data policies. Using the virtual connection editor, you can create:

- Virtual connections that provide a sharable central access point to data.
- Data policies to apply row-level security at the connection level.

Tableau Catalog, Tableau Prep Conductor, virtual connections, and data policies are licensed through Data Management. For more information about licensing, see License Data Management.

To purchase Data Management, contact your account manager.

Data Management Features

The following table lists the features for Data Management, which includes:

- Tableau Catalog
- Tableau Prep Conductor
Virtual connections
Data policies

Tableau Catalog

These features require Data Management with Tableau Catalog enabled.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissions on metadata</td>
<td>Tableau Catalog enables you to control who can see and manage external assets and what metadata is shown through lineage by setting permissions.</td>
</tr>
<tr>
<td>Expanded connect experience - data discovery</td>
<td>Whether you author in the web or in Tableau Desktop, you can now search for and connect to the specific databases and tables used by published data sources and workbooks on your Tableau Server or Tableau Online site.</td>
</tr>
<tr>
<td>Expanded search</td>
<td>Tableau Catalog expands search to include results based on columns, databases, and tables.</td>
</tr>
<tr>
<td>Tag external assets</td>
<td>You can categorize items on Tableau Server and Tableau Online with tags, helping users to filter external assets (databases, files, tables, and columns).</td>
</tr>
<tr>
<td>Certify databases and tables</td>
<td>Help users find trusted data that meets the standards you set by certifying databases and tables.</td>
</tr>
<tr>
<td>Set data quality warnings</td>
<td>You can set warnings to alert users to data quality issues, such as stale or deprecated data.</td>
</tr>
<tr>
<td>Lineage and impact analysis</td>
<td>The Lineage tool traces the source of your data. You can use it to analyze the impact of changes to your data, identify which users might be impacted, and email owners of a workbook, data source, or flow, or contacts for a database or table, about data-related updates.</td>
</tr>
</tbody>
</table>
Feature | Description
--- | ---
**Data Details** | Enable users to better understand a published visualization by seeing information about the data used.

**Add descriptions to assets** | Help users find the data they’re looking for by adding descriptions to databases, tables, and columns.

| Developer resources | **Tableau REST API - metadata methods** | Programmatically add, update, and remove external assets; and add additional metadata to Tableau content and external assets like descriptions.

| **Tableau Metadata API** | Programmatically query metadata from the content published to Tableau Server or Tableau Online. Programmatically update certain metadata using the *metadata methods* in the Tableau Server REST API. **Note:** The Metadata API does not require Data Management.

| **GraphiQL** | Explore and test queries against the Metadata API schema using an interactive in-browser tool called GraphiQL. **Note:** GraphiQL does not require Data Management.

---

**Tableau Prep Conductor**

These features require Data Management with Tableau Prep Conductor enabled on **Tableau Server** or **Tableau Online**.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schedule Flow Tasks</strong></td>
<td>You can create scheduled flow tasks to run a flow at a specific time or on a recurring basis.</td>
</tr>
</tbody>
</table>
Virtual connections and data policies

These features require Data Management.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a Virtual Connection</td>
<td>A Tableau content type that enables you to create a shareable re-usable connection to curated data.</td>
</tr>
<tr>
<td>Create a Data Policy for Row-Level Security</td>
<td>Use the virtual connection editor to create data policies with policy conditions that apply row-level security to the data at the connection level.</td>
</tr>
<tr>
<td>Test Row-Level Security with Preview as User</td>
<td>Test the data policy with Preview as user to ensure that users can see only their data.</td>
</tr>
<tr>
<td>Schedule Extract Refreshes for a Virtual Connection</td>
<td>Create an extract refresh schedule for the tables in your connection, ensuring that the data is fresh for any content that uses that virtual connection.</td>
</tr>
</tbody>
</table>
License Data Management

Data Management includes Tableau Catalog, Tableau Prep Conductor, virtual connections, and data policies. Contact your account manager (or go to the Tableau pricing page) to purchase Data Management.

Tableau Prep Conductor

After you purchase and license Data Management, you must enable Prep Conductor on Tableau Online. For more information, see Enable Tableau Prep Conductor on Your Tableau Online Site.

- At least one resource block is required to use Tableau Prep Conductor in Tableau Online. To learn more about resource blocks, see Resource Blocks.
- When Data Management is active and enabled, you can schedule flows in Tableau Server or Tableau Online and monitor flows.
- When Data Management is removed or deactivated, or if the Data Management license expires, then the ability to schedule flows is disabled.
- If your Tableau Server or Tableau Online license is still active and valid, you can download the flows using the Tableau Server REST API. For more information, see Flow Methods.

Tableau Catalog

After you purchase and license Data Management for Tableau Online, Catalog is automatically enabled.

- When Data Management is active and enabled, you can use Tableau Catalog to discover data, curate data assets, perform impact analysis, and trace the lineage of data used in Tableau content.
- When Data Management is removed, deactivated, or the license expires, the information remains on the server. The Tableau Catalog-specific information is then only accessible using the Tableau Metadata API; it no longer appears in the product. For more information, see the Metadata API.
- When Data Management is removed, deactivated, or the license expires, the write APIs for all new Tableau Catalog information (for example, table descriptions, data
Virtual connections and data policies

After you purchase and license Data Management for Tableau, virtual connections and data policies are automatically enabled.

- When Data Management is active and enabled, you can use virtual connections to create sharable resources that provide a central access point to data. You can also create data policies that enable you to filter data for users using centralized row-level security.
- When Data Management is removed, deactivated, or the license expires, the information remains on the server but is not accessible.
- When Data Management is reactivated, the information is restored on the server and becomes accessible.

Resource Blocks

Resource Blocks are units of compute capacity in Tableau Online. Resource Blocks run Tableau Prep Conductor flows. Each Resource Block can run one flow at a time so the number of flows you can run concurrently is equal to the number of Resource Blocks that you have.

When you license Data Management for Tableau Online, you must purchase at least one Resource Block. To purchase more Resource Blocks, contact your account manager (or go to the Tableau pricing page for more information).

Tableau Prep Conductor

Tableau Prep Conductor enables you to leverage the scheduling and tracking functionality available in Tableau Online to run your flows automatically to update the flow output. Tableau Prep Conductor is part of Data Management introduced in Tableau Online version 2019.1 and must be enabled to schedule your flows to run.
**Note:** Starting in version 2020.4, the Data Management is only required if you plan to run flows on a schedule or set up email notifications. You no longer need the Data Management to publish flows and manually run them on the web, and as a Creator, create and edit flows directly on your server.

You must be published your flows to Tableau Online before they can be scheduled to run. Publishing flows is similar to publishing data sources and workbooks. You can package files with the flow or specify a direct connection to data sources to update the flow input as data changes. If your flow connects to databases, specify the authentication type and set credentials to access the data.

You can also publish a flow to share it with others or to continue editing it on the web. For example, publish an incomplete flow to Tableau Online and then open the flow on the web in Edit mode to continue working on it. You could also create a flow with only Input steps (that are properly configured) and share it with co-workers who can then download the flow to their computers and create and publish their own flows.

For flows to run they must include output steps and have no errors or incompatible features. For more information about publishing a flow, see Publish a Flow to Tableau Server or Tableau Online. For more information about incompatibility, see Version Compatibility with Tableau Prep.

The following table shows the flow management features that are available with and without the Data Management and Tableau Prep Conductor enabled.

<table>
<thead>
<tr>
<th>Data Management with Tableau Prep Conductor enabled</th>
<th>No Data Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• View and monitor the details about your flow, including recent activity in the <strong>Content</strong> pages.</td>
<td>• View the details about your flow, including recent activity in the <strong>Content</strong> pages.</td>
</tr>
<tr>
<td>• Edit your flow (starting in version 2020.4).</td>
<td>• Edit your flow (starting in</td>
</tr>
</tbody>
</table>
• View the results of the flow runs and any errors in the Run History tab.

• Use Administrative Views to monitor server and site activity including a new view that tracks flow performance history.

• View detailed alerts for failed flow runs.

• Set up email notification alerts to send emails to flow owners notifying them when the flow failed to run and why.

For more information about setting up alerts, see Monitor Flow Health and Performance.

<table>
<thead>
<tr>
<th>Enabling Tableau Prep Conductor on Tableau Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>After you purchase and license Data Management, you must enable Prep Conductor on Tableau Online. For more information, see Enable Tableau Prep Conductor on your Tableau Online Site and License Data Management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>About the Flow Workspace</th>
</tr>
</thead>
<tbody>
<tr>
<td>After you publish your flow you can schedule tasks or linked tasks (version 2021.3 and later) in Tableau Online to automatically run your flows on a regular basis to keep your output data fresh. You can also run your flows manually at any time (no Data Management required).</td>
</tr>
</tbody>
</table>

Tableau Prep Conductor leverages much of the same functionality for managing flows that you might see when managing workbooks or data sources from Tableau Desktop in Tableau Online. For example, just like extract refreshes, scheduled flow tasks and on-demand flow runs are queued as background tasks. But when it comes to working with flows, there are a few differences.
Flow Overview page

The flow **Overview** page is the main landing page where you can view data about your flow and schedule, monitor, and maintain the flow. If you don't have the Data Management, you will have different options.

Open the flow **Overview** page by clicking on a flow in your list. You can navigate there from **Content > Explore > All Flows** or by opening the project that contains your flows.

A. The header lists the name of the flow, the flow owner and the date that the flow was last modified. Starting in version 2020.4, click **Edit** to edit existing flows.

Add a flow to your favorites, or from the **More actions ...** menu you can also edit, run, download the flow, set permissions, change the flow owner, restore previous flow versions, and more.

B. View and edit the flow description and set tags to help others find the flows they are looking for.

C. View the output steps for a flow along with any parameters applied to the flow (version 2021.4 and later), the status of the last update, any schedule the output is
assigned to, and any errors from the last flow run. You can also click the Run button to run all output steps or individual output steps on-demand.

**Note:** If the flow includes parameters, the parameter value last run in the flow shown and you can see all generated outputs in the Output column. When the flow is run, you’ll be prompted to enter the parameter values. For more information about using parameters in flows, see Create and Use Parameters in Flows in the Tableau Prep help.

If the flow has errors, the flow run will fail. Connectivity errors can be resolved directly by navigating to the Connections tab for the flow and editing the input connections.

To resolve any other flow errors, edit the flow then republish it and try running the flow again. If you are using an earlier version of Tableau Prep Builder, from the More actions menu, you can also download and open the flow in Tableau Prep Builder, then republish it and try running the flow again.

After a flow has run successfully, outputs that are data sources become links that you can click to open the Data Source page to view more information about the data source or edit the flow input connection.

In the Schedule field, view the scheduled tasks that the output step is assigned to. A flow output can be assigned to one or more tasks.

If no schedule has been assigned yet, click Create new task to add the output step to a schedule. To immediately run the flow to update a specific output step, click the Run button on the left-hand side of the row.

**D.** View an image of the flow.

Flow Overview page without the Data Management

If you don't have the Data Management installed on your server, you can still publish flows to Tableau Online, but you will see fewer options to manage your flow.
Flow Connections page

View both the input and output locations for a flow, connection types, authentication settings, input and output steps and any connectivity errors. You can set authentication settings when publishing a flow. For more information, see Publish a Flow.

For database input types, click the More actions ... menu for an input connection to edit the connection and change the server name, port, user name and password.
Flow Scheduled Tasks page (Data Management required)

View any schedules that the flow is assigned to, the outputs that are included in those schedules, and any parameters applied to the flow (version 2021.4 and later). As an administrator, you can click the schedule link to open the Schedules page and see a list of flows that are assigned to that schedule. For more information about assigning flows to a schedule, see Schedule Flow Tasks.

To view the outputs on a schedule or the tasks assigned to a linked task (version 2021.3 and later), click the links in the Schedule type column.

You can also add new tasks or manage existing ones from this page. To take action on an existing task, select the check box on a task card then click the Actions drop-down menu to run, edit, or delete the task.

If a flow task fails to run after 5 consecutive attempts, the flow is automatically suspended.

You can see that status on the Overview tab as well as this tab. You can resume suspended tasks from this menu.

For more information about suspended flow tasks, see View and resolve errors.

Note: The Scheduled Tasks page for flows was redesigned in version 2021.3. Your view may look different depending on your server version.
Schedules page

On the Schedules page, you can view the flows assigned to a schedule and the details about the flow runs. If the schedule includes linked tasks (version 2021.3 and later) the number of flows included in the linked tasks is shown.

You can run the schedule on-demand and run all flows assigned to it. You can also select one or more flows, then use the Actions menu to change the flow schedule or priority, delete selected flows from the schedule or resume suspended flows.

Flow Run History (Data Management required)

See, search, and sort through a list of historical runs for a flow. This page also includes details about the flow run such as run type, parameter values applied to flows included in each flow run (version 2021.4 and later), duration and number of rows that were generated.

If the flow output has an error, hover over the error to view the messages. If applicable, click the Go to Connections link in the error message to navigate to the Connections page to fix connectivity errors. You can also edit the flow directly to fix any errors, or click Download.
the flow to download and fix flow errors in Tableau Prep Builder, then republish the flow to continue to manage it using Tableau Prep Conductor.

**Note**: The run history for a flow will persist unless the flow is deleted.

---

**Flow Revision History**

If you need to revert a flow to a previous version, from the More actions ... menu for the flow, select Revision History. On the Revision History dialog, select the flow version from the list that you want to revert to.

---

**Who can do this**

Server Administrators can activate Data Management license keys.

Server administrators can enable Tableau Prep Conductor.
Creators can create, edit, and run flows manually. If the Data Management is installed, creators can run flows on a schedule.

Enable Tableau Prep Conductor on your Tableau Online Site

Prep Conductor is automatically enabled on your Tableau Online site after you purchase Data Management. For information on how to purchase Data Management, contact your account manager.

Verify Tableau Prep Conductor is enabled

1. Sign into the server through the Server->Sign In menu.
2. Open any of your flows.
3. Verify if there is a Scheduled Tasks tab. If the tab is there, then Prep Conductor is enabled.

Schedule Flow Tasks

**Note:** Starting in version 2020.4.1, you no longer need the Data Management to publish flows to the web. As a Creator, you can also create and edit flows directly on your server. If you want to schedule flows to run on your server, the Data Management is required. For more information authoring flows on the web, see Tableau Prep on the Web.

To schedule flows to run at a specific time or on a recurring basis you can create scheduled tasks. Scheduled tasks rely on pre-configured schedules.

To assign a flow to a schedule, select one of the pre-defined schedules provided with Tableau Prep Conductor. New schedules cannot be created in Tableau Online.

Starting in version 2021.3, you can link flow runs together when scheduling tasks to run flows one after the other. For more information, see Schedule linked tasks in this topic.
Tableau Online Help

Starting in version 2022.1, you can also run linked tasks via the REST API using the new flow methods **Query Linked Tasks**, **Query Single Linked Tasks**, and **Run Linked Task Now**. For more information, see **Flow Methods** in the Tableau REST API help.

**Running flows that include parameters**

Starting in version 2021.4, you can include parameters in your flows to make flows more dynamic. When the flow runs, you are prompted to enter your parameter values. When setting up flows on a schedule, you specify parameter values at that time.

You must specify the parameter values for any required parameters. For optional parameters, you can enter those values as well, or accept the current (default) value for the parameter. For more information about running flows with parameters, see **Run flows on a schedule** in the Tableau Prep help.

**Note:** Your administrator must enable the **Flow Parameter** server and site settings on your server before you can run flows that include parameters in Tableau Server or Tableau Online. For more information, see **Create and Interact with Flows on the Web** in the Tableau Server or Tableau Online help.

**Schedule a flow task**

1. Do one of the following:
   
   - (version 2022.1 and later) From the **Explore** page, in **List** view, in the **Actions** menu, select **Schedule Flow > Single Task**. If you select a flow in the list, you can also use the top **Actions** menu.
• From the Overview page for the flow, Scheduled Tasks tab, click New Task or click the drop-down and select Single Task.

If the output step isn’t assigned to a task, you can also create a new task from the Overview page. On that page, in the Schedules field, click Create new task.

2. In the New Task dialog, on the Single Task (New Task in prior releases) tab, select a schedule from the drop-down list.
3. Select one of the following options:

- **Automatically include all output steps for this flow:** (default) Select this option to include all current and future output steps for this flow in the scheduled task. As new output steps are added to the flow over time, they are automatically included in the schedule when it runs.

- **Select the output steps to include in this task:** Select this option and manually select the output steps to include in this scheduled task.

To include all output steps in the flow task, select the check box next to **Output Steps**. This area can't be edited if the **Automatically include all output steps for this flow** radio button is selected. Select the other radio button to
enable this section.

4. (version 2020.2.1 and later) Select a **Refresh Type**. For more information about these settings, see Refresh Flow Data Using Incremental Refresh.

**Note:** Starting in version 2020.2.1 and later, if one input is configured to use incremental refresh and it is associated with multiple outputs, those outputs must be run together and must use the same refresh type. Otherwise the flow will fail.

- **Full refresh** (default): Refresh all data and create or append data to your table based on the flow output setting.

- **Incremental refresh**: Refresh only the new rows and create or append data to your table based on the flow output setting. The incremental refresh option is only available when the flow is configured to use this refresh type.

**Note:** Tableau Prep Conductor runs a full refresh for all outputs regardless of the run option you select if no existing output is found. Subsequent flow runs will use the incremental refresh process and retrieve and
process only your new rows unless incremental refresh configuration data is missing or the existing output is removed.

5. (optional) If you are the flow owner, select **Send email when done** to notify users when the flow is successful. For more information about how to send email notifications on flow runs, see Notify Users of Successful Flow Runs.

6. (version 2021.4 and later) If your flows include parameters, enter any required or optional parameter values. You must enter required values for the flow to run.
7. Click **Create Task** to create the scheduled task.

**Schedule linked tasks**

*Supported in Tableau Server and Tableau Online version 2021.3.0 and later.*

**Note:** Starting in version 2022.1, Linked tasks functionality is enabled by default. Server and Site Administrators can turn off this functionality on the **Settings** page and on flow schedules in the **Schedules** dialog. In previous versions, Server Administrators must first enable this functionality to use and manage it.

Use the **Linked Tasks** option to schedule up to 20 flows to run sequentially, one after the other. Easily set up your flow list by selecting your schedule, then select downstream flows to run in the order you choose.

In Tableau Online, the duration of each individual linked task is counted towards the total flow runtime limit. If the runtime limit is reached when a flow task is run, the flow task will
timeout, the linked task will fail, and any downstream flows won't be run. For more information, see Job Runtime capacity in the Tableau Online help.

Flows run in the order specified in the list. Use the menu to move flows around in your list or add new upstream or downstream flows to the list at any time.

Select the outputs that you want to include in the flow run and configure the settings to tell Tableau what to do with remaining flows in the schedule when the previous flow run fails.

1. Do one of the following:
   
   (version 2022.1 and later) From the Explore page, in List view, in the Actions menu, select Schedule Flow > Linked Task. If you select multiple flows in the list, you can also use the top Actions menu.
- From the **Overview** page for the flow, **Scheduled Tasks** tab, click **New Task** and select the **Linked Task** tab, or click the drop-down and select **Linked Task**.

![Scheduled Tasks Tab](image)

If the output step isn't assigned to a task, you can also create a new task from the **Overview** page. On that page, in the **Schedules** field, click **Create new task**.

2. In the **New Task** dialog, on the **Linked Tasks** tab, select a schedule from the drop-down list. Only schedules that are enabled for linked tasks are shown.
3. Click the **Select output steps** drop-down to select the flow outputs to run. By default, all flow outputs are included. To select specific outputs, clear the **Include all current and future output steps for this flow** check box.

The flow where the task is initiated is automatically set as the first flow to run, but you can use the menu to change the run order after you add other flows to your list.
4. Select your refresh type from the following options:

**Note:** If one input is configured to use incremental refresh and it is associated with multiple outputs, those outputs must be run together and must use the same refresh type. Otherwise the flow will fail.

- **Full refresh** (default): Refresh all data and create or append data to your table based on the flow output setting.

- **Incremental refresh**: Refresh only the new rows and create or append data to your table based on the flow output setting. The incremental refresh option is only available when the flow is configured to use this refresh type. For more information, see [Refresh Flow Data Using Incremental Refresh](#).
**Note:** Tableau Prep Conductor runs a full refresh for all outputs regardless of the run option you select if no existing output is found. Subsequent flow runs will use the incremental refresh process and retrieve and process only your new rows unless incremental refresh configuration data is missing or the existing output is removed.

5. (optional) If you are the flow owner, select **Send email when done** to notify users when the flow is successful. For more information about how to send email notifications on flow runs, see Notify Users of Successful Flow Runs.

6. Set your flow failure options:

   - **Add data quality warning:** Select the check box to set a warning message on the flow so that users of the data are aware of issues. The message remains until the flow runs successfully. If the flow already has a data quality warning, this option shows selected and can't be turned off.

**Note:** In version 2021.4 and earlier, click the **Flow run monitoring** icon to open the **Data Quality Warning** dialog.
- **Stop remaining tasks**: Select this option to prevent the downstream tasks in the list from being queued to run.

- **Email me**: Email notifications are automatically sent to the flow owner when the flow fails, is suspended, or is canceled.

7. (version 2021.4 and later) If your flows include parameters, enter any required or optional parameter values. You must enter required values for the flow to run.

8. Click the drop-down for the 2nd task to add your next flow. Flows that use the previous flow’s outputs are shown automatically or click **View all flows** to see all available flows.

Select one or more flows and click **Add** or click **Add Next Task** to add more flow run tasks to your list.
If you don’t have permission to run the flow, you must contact the flow owner to grant permissions before adding the flow to your list.

9. Repeat steps 3-5 to configure your flow run options.
Note: In version 2021.4 and earlier, click the Edit icon next to your new flow to expand the Options pane.

10. (Optional) Click the drop-down next to any numbered task to open the menu to change the order of your flow tasks or insert new tasks between existing tasks.

11. Click Create Tasks to create the scheduled linked tasks.

Who can do this

- The Server administrator can do this on all sites on the server. The Site administrator can do this on sites they have access to if the site settings to allow users to publish and schedule tasks is enabled.
- For linked tasks, the Server administrator can do this on all sites where the server settings to allow users to schedule linked tasks is enabled. The Site administrator can do this on sites they have access to if the site settings to allow users to schedule linked tasks is enabled.
- Flow owners and project leaders can create flow tasks for flows or projects that they own respectively.

For more information, review the following articles:

- Windows: Set Users' Site Roles and Content Permissions and Ownership
- Linux: Set Users' Site Roles and Content Permissions and Ownership

Site administrators, flow owners, project leaders, can create flow tasks for the flows and projects that they own respectively.
For more information, see Set Users’ Site Roles and Content Ownership and Permissions

**Notify Users of Successful Flow Runs**

*Supported in Tableau Prep Builder version 2021.4.1 and later and in Tableau Server and Tableau Online version 2021.4 and later. Data Management is required to use this feature.*

Flow owners can subscribe themselves, individual users, and groups to email notifications for information about scheduled tasks for successful flow runs. The email includes links to data within the Tableau environment, or you can optionally include the details of the flow run in attached Excel and CSV files.

Flow subscriptions are added to scheduled tasks for flows. You can add flow subscriptions when you create a new flow task or to an existing flow task. Email notifications are sent when the scheduled task is completed successfully.

**Configure the site settings for flow subscriptions**

By default, the Flow Subscriptions site setting for sending and receiving email notifications is enabled.

<table>
<thead>
<tr>
<th>Flow Subscriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow owners can schedule and send emails with flow output data to themselves and others. Learn more</td>
</tr>
<tr>
<td>☑ Let users send or receive emails that include flow output data</td>
</tr>
<tr>
<td>□ Attach .csv and .xlsx flow output files. This option sends data outside of Tableau and is not recommended</td>
</tr>
</tbody>
</table>

- The **Let users send or receive emails that include flow output data** option allows the flow owner to receive, and subscribe users and groups to successful flow run notifications. From the notification email, users can access the full data source or view the flow details from within Tableau.
- (Not recommended) The **Attach .csv and .xlsx flow output files** option lets the flow owner attach files to notification emails. The email recipients must be added to the
Tableau server or site, however, the files contain the data source and can be exposed outside of the Tableau system. This option is available only for on-premise environments.

Publish the Flow

Publish the flow output as either a file, database table, or data source. Consider the following when saving the flow:

- (On-premise only) When publishing you can save the output as a file or as a database table and choose to attach either a .csv or .xlsx file type to the email.

- When publishing and saving the output as a published data source, the email notification provides a link to the flow in Tableau. Files cannot be attached to the email.

- When choosing to save as a file output, you must use a network share and the output and input location must be included in a safe list. For more information, see Step 4: Safe list Input and Output locations.

- Flow subscriptions are supported on Windows. Flow subscriptions with file output are not supported when the output files originate from non-Windows operating systems due to cross-platform UNC file path writability.

- When attaching files to an email, the file limit is approximately 25 MB for Tableau Online. When using an on-premise Tableau Server, you configure the size of attachment files.

Add a flow subscription

1. As the owner of the flow, select a published flow in Tableau Server or Tableau Online that you want to add subscriptions to for email notifications.

2. You can add subscriptions to a new or existing task:
   - If you are adding a subscription to a new task:
     1. Click Scheduled Tasks > New Task.
     2. In the New Task dialog select a schedule to run the flow from the Select
3. Enable **Send email when done**
   - If you are adding a subscription to an existing task:
     1. Click **Subscriptions > Subscribe**.
     2. In the **Add Flow Subscriptions** dialog, select a schedule from the **Frequency** drop-down list.

3. In the **Send to** field, start typing the name of the user or group to populate the field. Select the users and groups that you want to send a notification to.

   Users and groups must be added to the Tableau environment by the administrator.

4. (Optional) To be included in the notification, check the **Send to me** box.

5. (Optional) In the **Subject** field, customize the default email subject line for the flow run notification.

6. (Optional) Add information about the flow run in the **Email message** text box.

7. Click **Include output data** and select the type of output that you want to include in the email.
   - If you published your flow as a file or database table output you can choose to attach .csv or .xlsx files containing the data source to the email. This is not recommended because data can be exposed outside of the Tableau system.
   - If you published your flow as a data source, you can choose to include the link to the data source. Attaching files to the email is not supported.

8. If you are adding a subscription to an existing task, click Subscribe.
Unsubscribe from a flow subscription

To unsubscribe from notifications from the email, follow these steps.

1. Click **Unsubscribe** from the bottom of a subscription email.
2. As the flow owner, Sign in to Tableau Server or Tableau Online. At the top of the page, click the **Notifications** icon.
3. Expand the ... menu, then select **Remove notification**.

To unsubscribe and remove the subscription as the flow owner, follow these steps.

1. Click **Subscriptions**.
2. Open the published flow in Tableau Server or Tableau Online.
3. From the list of flow subscriptions, click the selection box for the flow you want to unsubscribe from.
4. Select **Actions > Unsubscribe**.

View Subscriptions

You can view your current flow subscriptions in Tableau Server or Tableau Online.

- From the **Subscriptions** tab on the **Overview** page of the flow, you can see the list of current subscriptions.
- From the **Subscriptions** tab on the **Tasks** page, you can see the list of subscriptions along with subscriptions to workbooks.

Resume suspended flow subscriptions

Sometimes, subscriptions fail because of an issue with the flow. If a subscription fails more than five times, you’ll receive a notification email that your scheduled flow task has been
suspended.

From the flow Overview page, you can see when a scheduled flow task fails.

<table>
<thead>
<tr>
<th>Overview</th>
<th>Connections</th>
<th>Scheduled Tasks</th>
<th>Run History</th>
<th>Subscriptions</th>
<th>Lineage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Connections</td>
<td>Scheduled Tasks</td>
<td>Run History</td>
<td>Subscriptions</td>
<td>Lineage</td>
</tr>
<tr>
<td>Run All</td>
<td>Run</td>
<td>Output step</td>
<td>Output name</td>
<td>Status</td>
<td>Schedule</td>
</tr>
<tr>
<td>Run</td>
<td>Output</td>
<td></td>
<td>Output</td>
<td>4 Failed Nov 15, 2020, 3:00</td>
<td>Run every Monday - 11:00</td>
</tr>
</tbody>
</table>

There are a few ways to resume a suspended flow task. If you're flow owner:

- From the My Content area of Tableau web pages, an icon appears in the Last update column to indicate that the subscription is suspended. Select ... > Resume Scheduled Tasks to resume.

- From the Scheduled Tasks page, an icon appears in the last update column to indicate that the subscription is suspended. Select the flow, then click Actions > Resume.

Access the flow data from a notification email

Depending on how the flow notification was configured, you can access the data source and file attachments from the notification email.

- Click View Flow to open the flow in Tableau Server or Tableau Online.
- Click the attachment file to view the flow data.
Who can do this

- Flow owners can create flow notification subscriptions for flows that they own.
- To receive notifications, users and groups must be added to the Tableau environment by the administrator.

For more information, review the following articles:

- Windows: Set Users' Site Roles and Content Permissions and Ownership
- Linux: Set Users' Site Roles and Content Permissions and Ownership
Manage a Flow

Once you publish a flow to Tableau Server or Tableau Online, you can manage your flows and make changes to them as necessary. This topic describes the various actions you can take to manage your flows.

Note: The content in this topic applies to both Tableau Server and Tableau Online, exceptions are called out specifically.

Managing your flows

Following is a list of actions you can take to manage your flows:

- **Create flows:** Starting in version 2020.4, as a Creator you can create flows directly on the web. From the Home page, click Create > Flow or from the Explore page, click New > Flow. For more information, see Tableau Prep on the Web.

- **Edit flows:** Starting in version 2020.4, as a Creator you can edit flows directly on the web. Navigate to the list of flows, select Actions and click Edit Flow, or open a flow and click the Edit button.

  When you edit a flow, your changes are moved to a draft state. When you're finished, publish your flow to commit your changes and create a new version of the flow. For more information, see Autosave and working with drafts.

- **Run flows:** You can manually run a flow in addition to creating scheduled flows tasks that run at a specific time.

  Note: The Data Management is not required to manually run flows, but is required to schedule flows to run.

- Navigate to the list of flows, select one or more flows you want to run, select Actions
and click **Run Now**.

- **Tag:** Tags are keywords you can create for flows to help you find, filter, and categorize content. Authors can add tags to flows when they publish it. But you can also add tags to any workbook, view, or data source that you are allowed to access and you can delete any tags you have added. You can add a tag to a list of flows.

  Navigate to the list of flows, select one or more items you want to tag, select **Actions** and click **Tag**. To add a tag to a specific flow you can do it from the list of flows as described above. Open the Flow, from the Overview tab, select **Actions**, and click **Tag**.

- **Change Owner:** Administrators and flow owners can change owners, and only to themselves.

- **Permissions:** You can set permissions for users and specify if they can perform edit actions like save, download, move to a different project and delete. In addition, you can specify who can view and run the flow.

- **Download:** You can download a flow to view or modify it using Tableau Prep Builder. To download a flow, you need download permissions. You’ll have that by default if you are the owner, but you might need to add it for other users.

- **Revision History:** When you make a change to the flow, and republish it to the same project with the same name, a new version of the flow is created. You can view the revision history by selecting revision history from the actions menu. Flow owners have permissions to restore a previous version of a flow.

- **Move:** You can move flows between projects. To move a flow, users need Move permission. You’ll have that by default for flows you own, but you might need to add it for other users.

- **Rename:** You can rename a flow. To rename a flow, users need the Save permission. You’ll have that by default for flows you own, but you might need to add it for
Tableau Online Help

other users.

- **Delete**: You can delete a flow. To delete a flow, users need the Delete permission. You’ll have that by default for flows you own, but you might need to add it for other users.

Who can do this

**Tableau Server Administrator**

**Can do the following tasks across all the sites:**

- Create flows
- Edit published flows
- View a list of all draft flows
- Run flows
- Delete flows
- Download flows
- Change Owner
- Change Permissions
- Change Project
- Add/Remove Tags
- Change Description
- Change Name
- Update Flow Task
- Delete Flow Task
Create a Flow Task*

Version Management*

*Some additional conditions apply to these actions:

To create a flow task:

- A flow schedule must be available. Only Server Administrators can create a schedule.
- The flow must have at least one output step.
- The flow version must be compatible with the Tableau Server version.

Version management:

- Revision history must be enabled on the site.
- User role is allowed to publish to the project.

Tableau Site Administrator

Can do the following tasks on flows published to the sites that they are site administrator for:

- Create flows
- Edit published flows
- View a list of all draft flows
- Run flows
- Delete flows
- Download flows
- Change Owner
- Change Permissions
Tableau Online Help

- Change Project
- Add/Remove Tags
- Change Description
- Change Name
- Update Flow Task
- Delete Flow Task
- Create a Flow Task*
- Version Management*

Some additional conditions apply to these actions:

- To create a flow task:
  - A flow schedule must be available. Only Server Administrators can create a schedule.
  - The flow must have at least one output step.
  - The flow version must be compatible with the Tableau Server version.

- Version management:
  - Revision history must be enabled on the site.
  - User role is allowed to publish to the project.

Project Leader

Can do the following tasks on flows published to the projects where they have project leader permissions:
• Create flows
• Edit published flows
• Run Flows
• Delete
• Download
• Change Permissions
• Change Project
• Add/Remove Tags
• Change Description
• Change Name
• Update Flow Task
• Delete Flow Task
• Create a Flow Task*
• Version Management*

*Some additional conditions apply to these actions:

• To create a flow task:
  • A flow schedule must be available. Only Server Administrators can create a schedule.
  • The flow must have at least one output step.
  • The flow version must be compatible with the Tableau Server version.

• Version management:
Project Owner

Can do the following tasks on flows published to the projects that they own:

- Create Flows
- Edit published flows
- Run Flows
- Delete
- Download
- Change Permissions
- Change Project
- Add/Remove Tags
- Change Description
- Change Name
- Update Flow Task
- Delete Flow Task
- Create a Flow Task*
- Version Management*

* Some additional conditions apply to these actions:
To create a flow task:

- A flow schedule must be available. Only Server Administrators can create a schedule.
- The flow must have at least one output step.
- The flow version must be compatible with the Tableau Server version.

Version management:

- Revision history must be enabled on the site.
- User role is allowed to publish to the project.

Flow Owner

Can do the following tasks on flows that they own:

- Create Flows
- Edit Draft (flows they own) and Published Flows
- Run flows
- Delete flows
- Download flows
- Change Owner
- Change Permissions
- Change Project
- Add/Remove Tags
- Change Description
- Change Name
Tableau Online Help

- Update Flow Task
- Delete Flow Task
- Create a Flow Task*
- Version Management*

*Some additional conditions apply to these actions:

- To create a flow task:
  - A flow schedule must be available. Only Server Administrators can create a schedule.
  - The flow must have at least one output step.
  - The flow version must be compatible with the Tableau Server version.

- Version management:
  - Revision history must be enabled on the site.
  - User role is allowed to publish to the project.

User with Creator License

Can do the following tasks:

- Create Flows
- Edit Draft (flows they own) and Published Flows
- Run Flows (with Run flow permissions)
- Delete (with delete permissions)
- Download (with download or Save as, and read permissions)
- Change Permissions (with Change Permissions)
• Change Project (with move permissions, and write permissions on the destination project)

• Add/Remove Tags (with read permissions)

• Change Description (with Save permissions)

• Change Name (with Save permissions)

• Update Flow task (with Execute permissions)

• Delete Flow Task (with Execute permissions)

• Create a Flow Task* (with Execute permissions)

• Version Management* (with view, read, save as, download permissions)

* Some additional conditions apply to these actions:

• To create a flow task:
  • A flow schedule must be available. Only Server Administrators can create a schedule.
  • The flow must have at least one output step.
  • The flow version must be compatible with the Tableau Server version.

• Version management:
  • Revision history must be enabled on the site.
  • User role is allowed to publish to the project.

User with Explorer License

Can do the following tasks:

Note: Starting in version 2020.4, Explorer users can no longer run flows on the server.
Tableau Online Help

- Delete (with delete permissions)
- Download (with download or Save as, and read permissions)
- Change Permissions (with Change Permissions)
- Change Project (with move permissions and write permissions on the destination project)
- Add/Remove Tags (with read permissions)
- Change Description (with Save permissions)
- Change Name (with Save permissions)
- Update Flow task (with Execute permissions)
- Delete Flow Task (with Execute permissions)
- Create a Flow Task* (with Execute permissions)
- Version Management* (with view, read, save as, download permissions)

*Some additional conditions apply to these actions:

- To create a flow task:
  - A flow schedule must be available. Only Server Administrators can create a schedule.
  - The flow must have at least one output step.
  - The flow version must be compatible with the Tableau Server version.

- Version management:
  - Revision history must be enabled on the site.
  - User role is allowed to publish to the project.

User with Viewer License
Viewers cannot manage flows, they can however view the flow and the different versions of the flow.

For more information about the full capabilities you can set on flows, see Permission capabilities.

Monitor Flow Health and Performance

After you publish flows and schedule them to run periodically, you want to know that they are running as expected and resolve any issues as they occur. You will also want to monitor and understand the performance of your flows.

This topic describes the various methods that Tableau Online provide to help you monitor your flows.

Detect issues as they occur and resolve them

In Tableau Online, email notifications are automatically sent when flows fail. You can also find and review errors on your server using the Alerts menu or by reviewing the flow pages for the flows that you are interested in. This type of monitoring allows you to detect problems as they occur.

Get notifications when a flow fails:

Email notifications is turned on by default for your site in Tableau Online. You can verify this by going to Settings > General page.

View and resolve errors

Note: Starting in version 2020.4.1, you can now create and edit flows directly in Tableau Server and Tableau Online. The content in this section applies to all platforms, unless specifically noted. For more information about authoring flows on the web, see Tableau Prep on the Web.

The following errors can happen when running a flow:
Connection errors: Connection errors generally happen when Tableau Online is unable to connect to one or more data inputs or is unable to make a connection in one or more output steps.

- For Input connection errors, use the Edit connections option on the Connections tab to make changes to connection details, then run the flow again.

- For output connection errors, check the output location for the flow output steps. If the flow output is going to a network share, make sure the output steps are pointing to a safe listed location. After you make any changes republish the flow and try running it again.

Note: To fix output connection errors for flows that output to a file or network share, download the flow to Tableau Prep Builder, then republish the flow to your server. Flows that output to a published data source or database can be edited directly on the web.

Errors in the flow: If there are errors in one or more steps in the flow, you will see an error message. You can edit the flow directly on the web and republish it. You can also download the flow to Tableau Prep Builder, resolve the errors, republish the flow to the server and then run the flow again.

Suspended flow tasks: When a scheduled flow task fails to run after a configured number of attempts, the flow task is suspended. By default, a flow task is suspended after 5 consecutive flow tasks failures.

A flow can have multiple scheduled tasks assigned to it, but only the failed tasks are suspended. All other flow tasks will continue to run unless they have errors. To resolve a suspended task, review and resolve the errors then run the flow on-demand or let the flow run automatically based on the assigned schedule.

You can view errors on the following pages:
Flow Overview page

On this page you can see the status of the most recent flow run and any errors. Hover on the error text to review the error details. If a scheduled task is suspended, a warning icon shows next to the schedule. Hover on the icon to view the status.

After you resolve the error that caused the flow to fail or the task to be suspended, you can run the flow manually or let the flow run based on the assigned schedule. For suspended flow tasks, click the Go to Scheduled Task link on the tooltip for the suspended task to navigate to the Scheduled Tasks page and click the Resume Scheduled Tasks button to resume the suspended tasks.

Connections page

The Connections page shows the most recent status and any related connectivity errors. To correct input errors, click the More actions ... menu for an input connection to edit the connection and change the server name, port, user name and password.

To fix output connection errors, edit the flow directly or download the flow in Tableau Prep Builder, correct the file path, then republish the flow to continue running it.
Scheduled Tasks page

**Note:** The Data Management is required to see this tab.

View the scheduled tasks assigned to a flow. If a scheduled task is suspended, you can see the status of that task here and you can manually resume the flow tasks from this page. Before resuming a suspended task, resolve any errors in the flow.

Error details are not shown on this page, but you can review them on the **Overview** or **Run History** pages. You can also click the links in the **Schedule type** column to view the details of what was scheduled and to edit the tasks.

A suspended scheduled task will automatically resume when the flow is republished, if you edit a connection for the flow or manually run the flow tasks. To manually resume a suspended task, on the **Scheduled Tasks** page, click **Resume Scheduled Tasks**. This resumes all suspended tasks for the flow.

To resume individual tasks, click the **More actions** ⋮ menu for a scheduled task and select **Resume**. You can also click **Run Now** to run all tasks for the flow immediately.
Run History page

**Note:** The Data Management is required to see this tab.

The Run History page shows the details of all the flow runs that have either completed or are in progress for each output. View any error details by hovering over the errors in the Errors column. The duration column shows you the run time of the flow.

**Note:** Starting in version 2020.2.1, the Run Type field shows the refresh type for the output. In prior releases, this field showed whether the output was run on a schedule or on-demand. For more information about setting up output refresh types, see Refresh Flow Data Using Incremental Refresh.

Alerts

When a flow fails, the alerts menu is populated with the error details with the option to re-run the flow, or download the flow to troubleshoot.

**Note:** Flow owners and Site Administrators can see this menu.
Who can do this

- **Tableau Site Administrators:**
  - Set up email notifications at the site level
  - View errors
  - Resume suspended tasks
  - View alerts

- **Flow owners, project leaders and any user who is granted permissions to view the flow:**
  - View errors
  - Resume suspended tasks
  - View alerts (Flow owners)

**Administrative Views for Flows**

Administrative views can be used to monitor the activities related to flows, performance history, and the disk space used. The **Status** page contains an embedded Tableau workbook with various administrative views that can be used to monitor different types of server or site activity.

Who can do this?

Tableau Site administrators can view and work with Administrative Views.
Action by all users

Use this view to gather insight into how flows are being used. This includes actions like publish, download, and flow runs. You can filter the view by actions, by site, and by time range. 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 users who have been active during the selected time period and performed one of the selected actions.

Action by Specific User

Use this view to gather insights about how an individual user is working with flows. You can filter the view by user name, the type of action, and by time range.
Action by Recent Users

This view shows you which users have been active on Tableau Online over the past 24 hours.

This can be useful if you need to do some maintenance activity on the server and want to know which users and how many this will affect, and what they’re doing.

The view shows **Active, Recently Active, and Idle** users that are currently signed in to Tableau Online.

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.

Select a user to see only the actions that user performed recently. Hover over an action to see details of the action.
Backgrounder Task Delays

This view shows the delay for extract refresh tasks, subscription, and flow 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 identify places you can improve server performance by distributing your task schedules and optimizing tasks.

Possible reasons for the delays and ways to reduce the delays include the following:
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. You can set the Timeline filter to a single day to view task delays by hour and identify the hours of the day when many tasks are scheduled at the same time. One solution is to distribute the tasks to off-peak hours to reduce load on the server.

Background Tasks for Non Extracts

Background Tasks are created to run flows (scheduled and ad hoc). You can use this view to see how many flow tasks succeeded or failed on this site. For details on a task, hover over its icon.

Performance of Flow Runs

Use this view to see the performance history for all the flows on a site. You can filter by Flow Name, Output Step Name, Flow Owner, Run Type (Scheduled or Ad Hoc), and the time the flow runs were started.
Questions you can answer using this view include:

- **What flow tasks are currently scheduled?** – To do this, use the Start Time filter and select the time frame you want to look at. For example, to see flow tasks that are scheduled in the next 3 hours, select **Hours -> Next ->** and enter 3.

- **What is the duration of flow tasks?** - To answer this, click on a mark in the view to see details, including the task duration.

- **How many flows were run ad hoc, and how many were scheduled runs?** - To answer this, use the Run Type filter and select **Ad hoc** or **Scheduled**.

This view can also show you the following information:

- Flows with the highest run frequency have the most marks.

- To see flows that are currently running at the same time, hover over a mark that shows “**In Progress**” or “Pending and select “**Keep Only**” to filter all flow runs that are currently running.

- To see flows that are running at the same time during a specific time range, select a range for the **Start Time** filter. For example, select “**Next three hours**” to see which flows will be running in the next three hours.

Stats for Space Usage

Use this view to identify which flow outputs are taking up the most disk space on the server. Disk space usage is displayed by user, project, and by the size of flow output and is rounded down to the nearest number.
Use the Min Size filter to control which flow outputs are displayed, based on the amount of space they take up. Use the object type filter for flows.

- **What Users Use the Most Space** – This section shows the users who own flows (when filtered for flows) that are taking up the most space. Click a user name to filter the next two graphs for that user.

- **What Projects Use the Most Space** – This section shows the projects with flows (when filtered for flows) that are using the most space.

- **What Workbooks, Data Source and Flows Use the Most Space** – This section shows the flows (when filtered for flows) that take up the most space.

Who can do this

- **Tableau Site Administrators:**
  - Set up email notifications at the site level
  - View errors
  - Resume suspended tasks
  - View alerts

- **Flow owners, project leaders and any user who is granted permissions to view the flow:**
  - View errors
  - Resume suspended tasks
  - View alerts (Flow owners)
About Tableau Catalog

Data is increasing in volume, formats, and importance leading to more complex environments. With the rapid pace that data changes, it can be hard to keep track of that data and how it's being used in such complex environments. At the same time, more users need to access more of that data in more places, and it's difficult for users to find the right data. Ultimately, this causes a lack of trust in the data because people question whether they’re using the right source or if the source is up to date.

Tableau Catalog integrates features like lineage, impact analysis, data dictionary, data quality warnings, and search into your Tableau applications, helping solve these problems differently from a stand-alone catalog. It focuses on both IT and the end user so that everyone using Tableau Server or Tableau Online has more trust in and visibility into the data, while also enabling more discoverability. Tableau Catalog builds a catalog out of the Tableau content being used by your organization, enabling comprehensive functionality like the following:

- **Impact analysis and lineage.**
  - You can see the workbooks and other Tableau content that depend on particular columns or fields from tables or data sources you manage. When you need to make changes to your data, you can notify the impacted Tableau authors using email.
  - As a workbook author, you can use lineage to trace the fields that your workbook depends on.
  - As a user, when you use a Tableau visualization, you can see where the data came from that was used to create the view.

- **Curation and trust.** As a data steward, you can add helpful metadata, like descriptions and certification, so that users find the right data. You can set data quality warnings, view data details on the Data Details pane, certify assets, and remove assets from the catalog.

- **Data discovery.** In Tableau Desktop or Tableau web authoring, you can use Tableau Catalog to search for databases, tables, data sources, and virtual connections to analyze in Tableau and connect to them from the search results.
Tableau Online Help

Starting in 2019.3, Tableau Catalog is available as part of the Data Management offering for Tableau Server and Tableau Online. When the product key is active and enabled, the catalog features described above are integrated into the product you're using, so you can work with the data where you find it.

How Tableau Catalog works

Tableau Catalog discovers and indexes all the content on your site—workbooks, metrics, data sources, sheets, virtual connections, and flows—to gather metadata about the content. From the metadata, databases and tables (also referred to as external assets) are identified. Knowing the relationships between the content and the external assets enables Tableau to display the lineage of the content and external assets. Tableau Catalog also enables users to connect to external assets using Tableau Server or Tableau Online.

For information about how you can use Tableau Catalog to support data governance in your organization, see Governance in Tableau in the Tableau Blueprint Help.

Key Tableau Catalog terms

- Metadata. Information about the data.
- Tableau content. Content created in Tableau such as workbooks, data sources, virtual connections, and flows.
- External assets. The metadata about the databases and tables used by Tableau content that's published to Tableau Server or Tableau Online.

License Tableau Catalog

Tableau Catalog is licensed through Data Management. For information about how Data Management licensing works, see License Data Management.

Enable Tableau Catalog

After Tableau Server or Tableau Online is licensed with the Data Management, you can enable Tableau Catalog by doing one of the following tasks:
For Tableau Online, no action is necessary. Tableau Catalog is on by default, configured to use derived permissions, and ready to use. For more information about derived permissions, see the Permissions on metadata topic.

For Tableau Server, the Server admin must first enable the Tableau Metadata API using the `tsm maintenance metadata-services` command. For more information, see Enable Tableau Catalog.

After the Metadata API is enabled, Tableau Catalog is on by default, configured to use derived permissions, and ready to use. For more information about derived permissions, see the Permissions on metadata topic.

Features and functionality

To learn more about the features you can use with Tableau Catalog, see the following Help articles:

Data discovery

- In the Connect pane on Tableau Desktop, under Search for Data select Tableau Server to connect to data using Tableau Server or Tableau Online. When Tableau Catalog is enabled, in addition to searching for published data sources to connect to, you can now search for and connect to the specific databases and tables used by published data sources and workbooks on your Tableau Server or your Tableau Online site.
- Search is expanded to include results based on columns, databases, and tables when Tableau Catalog is enabled.
- If you author in the web, in addition to published data sources, you can also connect to databases and tables.
- If you use Tableau Prep on the web, you can create new flows based on external assets, such as databases and tables.

Curation and trust

- Certify your data assets to help users find trusted and recommended data.
- Set data quality warnings to alert users to data quality issues, such as stale or deprecated data.
Tableau Online Help

- Categorize items on Tableau Server and Tableau Online using tags to help users filter external assets.
- Better understand published visualizations by using the Data Details tab to see information about the data used.
- Add descriptions to databases, tables, and columns to help users find the data they're looking for.

Lineage and impact analysis

- Use lineage to trace the source of your data and to analyze the impact of changes to your data and identify which users might be impacted.
- Email owners of a workbook, data source, or flow or contacts for a database or table about data-related updates.

Developer resources

You can use metadata methods in the Tableau REST API to programmatically update certain metadata. For more information about the metadata methods, see Metadata Methods in the Tableau Server REST API.

In addition to the REST API, you can use the Tableau Metadata API to programmatically query metadata from the content published to Tableau Server or Tableau Online. The Metadata API is fast and flexible and is best when you are looking to find out specific information about the relationship between metadata and its structures. Explore and test queries against the Metadata API using an interactive in-browser tool called GraphiQL.

Note: Data Management is not required to use the Metadata API or GraphiQL.

About Virtual Connections and Data Policies

Virtual connections are a Tableau content type, along with data sources, workbooks, metrics, and flows, to help you see and understand your data. Virtual connections provide a central access point to data. Another key feature introduced with virtual connections is data policies, which support row-level security at the connection level, rather than the workbook
or data source level. Row-level security data policies are applied to any workbook, data source, or flow that uses the virtual connection.

With virtual connections, instead of having one connection per Tableau content (data source, workbook, flow), with each connection requiring its own extract and security management, you can create one common managed connection that can access multiple tables in the same database. You can manage extracting the data and the security in one place, at the connection level.

For information about row-level security options, see an Overview of Row-Level Security Options in Tableau.

Key terms

- Virtual connection. A sharable resource that provides a central access point to data.
- Virtual connection table. A table in a virtual connection.
- Data policy. A policy that's applied to one or more tables in a virtual connection to filter data for users. For example, use a data policy to apply row-level security to tables in a virtual connection.
- Policy table. A fact or data table in a data policy that is filtered.
- Policy column. A column that's used to filter the data in the policy tables. A policy column can be in a policy table or in an entitlement table.
- Entitlement table. A table that includes both a policy column you can use to filter policy tables and another column you can relate (map) to a column in a policy table.
Policy condition. An expression or calculation that is evaluated for every row at query time. If the policy condition is TRUE, then the row is shown in the query.

License virtual connections and data policies

Virtual connections and data policies are licensed through Data Management. For information about how Data Management licensing works, see License Data Management.

Enable virtual connections and data policies

Virtual connections and data policies are automatically enabled on Tableau Server and Tableau Online with Data Management.

Permissions

Permissions for virtual connections work much like the permissions for other Tableau content. After you publish a virtual connection, anyone can view the connection. However, only the connection creator and administrators can access data using the connection, until the connection creator explicitly grants more permissions. When you create a virtual connection, you must set the permissions for the Connect capability to enable other users to connect to data using the virtual connection. For more information, see Set permissions on a virtual connection.

Permissions vs. data policies

Permissions define what a person can or can’t do with a piece of content in Tableau. Permissions are made up of capabilities—the ability to do things like view content, web edit, download data sources, or delete content. Permission rules define which capabilities are allowed or denied for a user or group on a piece of content. The interplay between license level, site role, and potentially multiple permission rules factor into the final determination of what a person can or can’t do—their effective permissions. See Permissions for details.

Data policies filter the data in a virtual connection, making sure that people see only the data they're supposed to see. A data policy is applied and filters the data when it’s viewed in the Tableau content (for example, a workbook or flow). The policy condition in a data policy is a
calculation or expression that defines access to the data. User functions are often used to limit access to users or groups. Access might be based on the user name, the group a user belongs to, or a region value. See Create a Data Policy for Row-Level Security for details.

Simply put, permissions determine which content you can see, access, or use; data policies determine which data you can see.

How permissions and data policies work together

Tableau permissions are applied to Tableau content first and foremost. People can only do the things they have the capabilities to do with Tableau content—data policies don't override Tableau permissions. After permissions are evaluated, the data policy is applied to determine which data in the virtual connection the person can see based on the policy condition.

The following example describes the effects of permissions and data policies on a virtual connection that contains salary data:

- The virtual connection is in the HR project, which is restricted to Tableau users in the HR group. Anyone outside the HR group can't see content in the HR project, which means they can't browse to, connect to, or view the virtual connection.
- The virtual connection has Connect permissions granted only to members of the HR Business Partners group. All others in the HR group can see that the virtual connection exists, but they can't view the data it contains. When they view a workbook that uses that virtual connection, they can't see any data.
- The virtual connection also contains a data policy that filters the salary data based on the individual user, so HR Business Partners can see only rows that pertain to employees in their business unit. When they view a workbook that uses that virtual connection, they see data only for their business unit.

Features and functionality

For the manager of data, virtual connections provide:

- **Securely managed service accounts.** If you use a ‘service account’ model, now instead of having to share that service account information with any user who wants to access that data, you can give the service account credentials to the few analysts...
who are empowered to create virtual connections.

- **Agile physical database management.** You need to make database changes (for example, a field is added or table name is changed) only once in the virtual connection, rather than in every piece of content where the data is used.

- **Reduced data proliferation.** By centrally managing extract refresh schedules, refreshes are scheduled once, ensuring that anyone who accesses the data from that virtual connection is seeing fresh data.

- **Centralized row-level security.** You can create data policies that apply row-level security to both Tableau extracts and live queries at the connection level. The data policies are applied to any workbook, data source, or flow that uses the virtual connection.

As the user of data, you benefit from virtual connections knowing that you have:

- **Appropriate access** to only the data you should see, because row-level security is already applied to the data.

- **Flexibility** to use data that's been curated and secured. The virtual connection stores and shares the connection information. All you have to do is create a data source with a data model specific to your needs.

- **Trust** that data is fresh because the extract refresh schedule has already been set.

- **The ability to share** content freely, assured that you won’t put security at risk because data policies are always enforced.

**Virtual connection editor workflow**

The virtual connection editor enables you to create:

- Virtual connections, which are a Tableau content type that provides a sharable central access point to data.

- Data policies that support row-level security at the connection level.

After you create a virtual connection and its associated data policies, you can publish it and set the permissions to share with other users. You can also schedule extract refreshes so that all content that uses the virtual connection is accessing fresh data.

The following diagram shows the workflow to create a virtual connection. At any time during the process, you can publish or save a draft of your connection, but the connection must be
published before you can schedule extract refreshes or use (or edit) a virtual connection. You must also set permissions before others can use the connection.

Click a step in the process to go to that help topic.

Next step

The first step is to Create a Virtual Connection.

Create a Virtual Connection

A virtual connection is a Tableau content type that provides a sharable central access point to data, and supports row-level security at the connection level. Creating a virtual connection is a multi-step process. This topic covers connecting to the data you want to share and working in the Tables tab of the virtual connection editor.
Connect to data

To create a virtual connection in Tableau Online or Tableau Server:

1. From the Home or Explore page, click **New > Virtual Connection**.
2. In the Connect to Data dialog box, click the connector for your data.
   - For a list of supported connectors for virtual connections, see **Creators: Connect to Data** in the Tableau Desktop and Web Authoring help.
3. Choose the connector for your data.
4. Enter the information you’re prompted for.
   - The credentials you enter are saved in the virtual connection, so connection users don't have to enter credentials to connect to the data.
5. Click **Sign In** to open the virtual connection editor.

Virtual connections support connecting to one database per connection. For more information about connectors, see Supported Connectors in the Tableau Desktop and Web Authoring help.

**Note:** For Tableau Online, virtual connections that connect to private network data use Tableau Bridge to keep data fresh. For information about configuring Tableau Bridge, see **Configure and Manage the Bridge Client Pool**. For information about supported connections, see **Connectivity with Bridge**.

Select tables to include in the connection

If tables aren't listed in the left pane of the editor, select a database.

1. On the left, under **Tables**, select the tables and click or drag them to the Tables tab on the right. Include an entitlement table, if you're using one.
2. (Optional) Click **New Custom SQL** to create a custom table schema.

**Note:** Virtual connections don't support tables with a spatial data type.
Select table mode: live or extract

At the top of the Tables tab, select a Table Mode. The mode you select applies to all the tables in the virtual connection:

- **Live Only** - Tables are queried directly from the database. (Live is the default.)
- **Extracts Only** - Tables are extracted and saved to Tableau. Note the following:
  - Click **Extract Now** to extract the data any time before you publish the virtual connection. You can’t edit the connection while extracts are running.
  - You can schedule extract refreshes on the virtual connection page after you publish the connection. For more information, see Schedule Extract Refreshes for a Virtual Connection.
  - When your site is set for encryption at rest, virtual connections don’t support extracts. You can either turn off site-wide extract encryption or use Live Only as the Table Mode.

Set the table visibility state

Use the Visibility toggle on the Tables tab to show or hide tables and their data from users.

- ![Visible](image) **Users can see table data.** You can create a data policy to govern which data users can see. (Visible is the default.)
- ![Hidden](image) **Users can’t see table data.** You can use hidden tables in a data policy and as an entitlement table.

See table details

Click a table at the top of the Tables tab to see its details below. You can make simple edits in the Table Details section, such as change a table name, hide or rename a column, or change a data type.

Switch the table information you see using these icons:

- ![Columns](image) A list of columns in the table and each column’s data type.
- ![SampleData](image) Sample data for each column and linked keys, if available. Linked keys show which...
columns link to other tables. They're visible only when databases have primary and foreign key information.

The range of values in a histogram for each column selected.

Who can do this

To create a virtual connection, you must
Next steps

After tables have been added and configured on the Tables tab, you can choose to Create a Data Policy for Row-Level Security or Publish a Virtual Connection and Set Permissions.

Create a Data Policy for Row-Level Security

Use a data policy to apply row-level security to one or more tables in a virtual connection. A data policy filters the data, ensuring that users see only the data they’re supposed to see. Data policies apply to both live and extract connections.

About data policies

A data policy has three main components:

1. The tables it applies to, called policy tables. These are the tables that are filtered.
2. The mapped columns that define the relationships between tables (for example, between entitlement and fact tables) and between table columns and policy columns. A policy column is the column used to filter data.
3. The policy condition, which is an expression or calculation that is evaluated for every row at query time. If the policy condition is TRUE, then the row is shown in the query.

When you create a data policy, you need a column you can use to filter the data. This column is called a policy column. Data is filtered by the policy condition, usually using a user function, such as USERNAME() or FULLNAME().
Tableau Online Help

If your policy table includes a column that you can filter on, then use that column as your policy column.

When a policy table doesn't include such a column, use an entitlement table with a column you can use to filter the data. An entitlement table is a table that includes both a policy column you can use to filter policy tables and another column you can relate (map) to a column in a policy table (as shown in the data policy example image above).

Filter with a policy column from a policy table

The most common way to filter data is to use a column in the table that has the data that you want to filter on. Use that column as a policy column and then map the appropriate table columns to the policy column.

To use a policy column to filter your data, first, add tables to the policy from the left pane. To add a table, do one of the following:

- Double-click the table name.
- Click the drop-down arrow near the table name and select **Add as policy**.
- Or, drag the table to the right and drop it on **Add as Policy Table**.

After a table is added to a policy, a shield icon appears to the right of the table name in the left pane indicating that it's a policy table.

Next, map columns to create a relationship between the column name in the table and the policy column name. Use the policy column name in the data policy condition to control row-level data access for users:

1. Click **Add Column to Map** to add one or more columns you'll use to filter data.
2. Name the policy column. You'll use this name in the policy condition.
3. For each table the policy applies to, use the drop-down menu to select the table column that maps to the policy column.
4. Repeat this process for as many policy columns as you want to use in the policy condition.
**Tip:** Instead of using the +Add Column to Map button, you can start typing the calculation in the policy condition area and use auto-complete to choose the column name, which will then populate the policy column information under Step 1.
An example using a policy column from a policy table

A. The Sales table has a [Salesperson] column, and the Region table has a [SalesRep] column. The Salesperson and SalesRep data matches the full name of Tableau users on your site.

B. You want to filter the Sales and Region data by Salesperson, so you name the policy column "Salesperson" and then map the Salesperson column from Sales and the SalesRep column from Region to the Salesperson policy column.

C. Then write the policy condition to filter both tables. Use the [Salesperson] policy column and the FULLNAME() user function so that each user can see only their own data.

Filter with policy column from an entitlement table

Entitlement tables are used when your policy table doesn’t contain a column you can filter on. You can use the entitlement table to map a column in the data table to a column in the entitlement table. Note the following:

- Be sure to include the entitlement table as a table in the virtual connection.
- The entitlement table must be on the same database as your data tables. If it isn’t, you might be able to use Tableau Prep to write the entitlement table to the database using a flow output. For more information, see Save flow output data to external databases in the Tableau Prep help.
- If you don’t want virtual connection users to see the entitlement table, you can toggle the setting in the Visibility column on the Tables tab to hide it.

To use an entitlement table to filter your data:
1. Add the data tables that you want the data policy to apply to. Do one of the following:
   - Double-click the table name.
   - Click the drop-down arrow near the table name and select **Add as policy**.
   - Or, drag the table to the right and drop it on **Add as Policy Table**.
2. After a table is added to a policy, a shield icon appears to the right of the table name in the left pane indicating that it’s a policy table.
3. Select the entitlement table, then either:
   - Click the drop-down arrow and select **Add as entitlement**.
   - Or, drag the table to the right and drop it on **Add as Entitlement Table**.
4. For each table that the policy applies to, click the drop-down menu and select the column to map the policy table to the entitlement table.
An example using a policy column from an entitlement table

A. Tables

B. Entitlement Table

C. Policy Condition

[\texttt{FULL NAME} = \texttt{FULLNAME()}]
Tableau Online Help

A. The data you want to filter has an EMP_ID column, but not an employee name column. However, you have a second table that includes columns for both EMP_ID and the employee’s FULL NAME. And, the values in the employee FULL NAME column match the full name of Tableau users on your site.

B. You can add Employees table to the policy as an entitlement table, and then map the policy table column name EMP_ID to the entitlement column name EMP_ID for each table.

C. Then use the FULLNAME() function in your policy condition to match the Tableau Server user's full name with the entitlement table’s [FULL NAME] column (which is the policy column) so that each user can see only their own data.

Write a policy condition

The last step in creating a data policy is to write a policy condition, which is a calculation or expression used to define row-level access. Policy conditions are often used to limit access to users or groups through user functions.

A policy condition:

- Is required in a data policy.
- Must evaluate to true or false.
- Shows rows when the policy condition is true.

Policy condition examples

Shows only rows where the Region column value is North:

\[ \text{Region} = "\text{North}" \]

Enables a signed-in user to see the rows where the user’s name matches the value in EmployeeName:

\[ \text{FULLNAME}() = \text{[EmployeeName]} \]

Enables members of the Managers group to see all rows, while users can see only the rows where their username matches the value in the employee_name column:

\[ \text{ISMEMBEROF('Managers')} \text{ OR USERNAME}() = \text{[employee_name]} \]
Note: When you close a policy tab, it doesn’t discard your work.

Supported Tableau functions in policy conditions

Policy conditions support a subset of Tableau functions:

- Logical (except null-related)
- String
- User
- Date
- Number: MIN, MID, MAX

To see which specific functions are supported, in the virtual connection editor, on the Data Policies tab, see the Reference panel on the right.

Who can do this

To create a data policy, you must

- have credentials to the database that the virtual connection connects to, and
- be a server or site administrator, or a Creator.

Next steps

After you create a data policy, the next step is to verify that it works as you expect it to. See Test Row-Level Security with Preview as User. Or, if you’re ready to share the virtual connection and its data policies with others, see Publish a Virtual Connection and Set Permissions.

Resources

For detailed information about calculations, see Understanding Calculations in Tableau in the Tableau Desktop and Web Authoring help.

For information about user functions, see User Functions in the Tableau Desktop and Web Authoring help.
Test Row-Level Security with Preview as User

Use **Preview as user** to test your data policy. You can see the data as the user sees it and ensure that row-level security is working as expected. This helps when the data policy keeps you from seeing the rows in the table (for example, if only salespeople can see rows, and you’re not a salesperson).

To preview the data when the data policy is applied:

1. Select a table.
2. In the Table Details section, select the **With policy applied** check box.
3. Click **Preview as user**, select a **Group** (optional) and a **User**.
4. Verify that the policy shows the correct data for that user in the table details.
5. Repeat for other users as needed.

**Tip:** In Table Details, click to show the range of values for a column, including which values show and which are filtered out by the data policy. Select one or two columns that are good indicators that the policy is correctly filtering the data.

Who can do this

To test a virtual connection, you must

- have credentials to the database that the virtual connection connects to, and
- be a server or site administrator, or a Creator.

Next step

After you test your data policy, when you’re ready to share the virtual connection with others, see **Publish a Virtual Connection and Set Permissions**.
Publish a Virtual Connection and Set Permissions

When you work in the virtual connection editor, your changes are automatically saved as a draft while you work. To share a new virtual connection with other users, you need to publish it.

Save a draft

You can manually save a draft of the connection by clicking the save icon in the toolbar or by selecting File > Save Draft from the menu.

When editing a published virtual connection, the connection stays available to users in its current published state. You can save your updates as a draft while you work on the connection in the editor. To share the updates to the virtual connection with other users, you need to publish it.

Draft in progress

If you close the editor while updating a published virtual connection, the next time you open the connection in the editor within seven days, you have the option of continuing to make edits to the existing draft, starting a new draft, or opening the connection in its current published state by clicking Cancel.

To return to a draft version of an unpublished virtual connection, you need to manually save the URL of the draft before you close the editor. You can use the URL to open the draft in the editor the next time you want to work on the connection within seven days. For example:

Publish the connection

To publish a new connection:

1. Click the **Publish** button in the upper right corner of the editor or select **File > Publish** from the menu.
2. In the Publish dialog box:
   a. Type a name in the **Name** field.
   b. Select a project to save the connection to.
3. Click **Publish**.

To publish an updated connection, click the **Publish** button in the upper right corner of the editor or select **File > Publish** from the menu.

Set permissions on a virtual connection

After you publish a virtual connection, you need to set the permissions so that others can use it. By default, all users can **View** the connection, in other words, see it listed under Virtual Connections in Tableau, but unless you set the **Connect** capability to **Allowed**, only you and administrators can use the virtual connection.

To set permissions:

1. Navigate to the virtual connection.
2. Open the Actions menu (...) and click **Permissions**.
3. Check the box under the Connect icon so that connect is allowed for all users.
Tip: You can add additional rules if you want to grant the permission only to certain users or groups.

4. Click **Save**.

For more information about permissions on Tableau content, see Permissions.

Who can do this

To publish a virtual connection or set permissions, you must

- have credentials to the database that the virtual connection connects to, and
- be a server or site administrator, or a Creator.

Next step

After you publish a virtual connection and set its permissions, you can **Use a Virtual Connection**.

**Schedule Extract Refreshes for a Virtual Connection**

One of the benefits of virtual connections is that you can reuse the same extract multiple times, reducing data proliferation and removing redundant extract refresh jobs. To ensure that extract data is fresh for any content that uses a virtual connection, you can create an extract refresh schedule for the tables in your connection.

**Extract tables**

1. Select **Extracts Only** from the **Table Mode** drop-down menu.
2. Click **Extract Now**. Note that you can’t edit the virtual connection while extracts are being generated.
3. Click **Extract** to extract the tables.
4. Click **Publish** to publish the virtual connection.
5. Click **File > Close** to close the virtual connection editor.
Schedule extract refreshes on Tableau Server or Tableau Online

1. Navigate to the virtual connection page. (From the Home or Explore page, click Virtual Connections from the drop-down menu, then select your virtual connection.)
2. On the Tables tab, the **Data is** column should have **Extract** as the value. If it doesn’t, refresh your browser.
3. Select the Scheduled Tasks tab and click **+New Task**.
4. The Create Schedule Task dialog box has different options, depending on your product:

**In Tableau Server:**
   a. Select a schedule from the drop-down menu.
   b. Select whether to keep all extract refreshes in sync (if one fails, they all fail) or refresh independently (extracts succeed or fail individually).
   c. Click **Add or Edit Tables** to select the tables you want to refresh. Virtual connections support only full refresh.
   d. Click **OK**.
e. Click **Create Scheduled Task**.

![Create Scheduled Task](image)

**In Tableau Online:**

a. Select the Refresh Frequency using the drop-down menus for **Repeats**, **Every**, and **At**. Select the days to refresh under **On**.

b. Select whether to keep all extract refreshes in sync (if one fails, they all fail) or refresh independently (extracts succeed or fail individually).

c. Click **Add or Edit Tables** to select the tables you want to refresh. Virtual connections support only full refresh.

d. Click **OK**.

e. Click **Create Scheduled Task**.
Virtual connections that connect to private network data use Tableau Bridge to keep data fresh. For more information, see Configure and Manage the Bridge Client Pool.

Who can do this

To publish a virtual connection or set permissions, you must

- have credentials to the database that the virtual connection connects to, and
- be a server or site administrator, or a Creator.
Next step

After you schedule extract refreshes for a virtual connection, you can Use a Virtual Connection.

Use a Virtual Connection

After a virtual connection is published and permissions are set, it’s available to users to connect to data in the same ways that users access all data in Tableau. When you need to edit a virtual connection or the data policy in the connection—for example, when the underlying schema changes—simply open the connection in the virtual connection editor, make your changes, and either save or publish the updates. You can also replace an existing data source in a workbook with a virtual connection.

Connect to a virtual connection

For web authoring in Tableau Online or Tableau Server:

1. On the Home or Explore page, click New.
2. Select the type of content you want to create: workbook, flow, or published data source.
3. In Connect to Data > On This Site > Content Type dropdown menu, select Virtual Connections.
4. Select the name of the connection and click Connect.

For Tableau Desktop and Tableau Prep:

1. On the Connect pane, under Search for Data, click Tableau Server.
2. Enter the server name and click Connect, or click Tableau Online.
3. Enter the information prompted for.
4. On the Search for Data dialog box, from the Content Type dropdown menu, select Virtual Connections.
5. Select the name of the connection and click Connect.
**Note:** There's no need to enter credentials when you connect using a virtual connection. The credentials to access the data are embedded in the connection.

**Edit a virtual connection or data policy**

When editing a published virtual connection, the connection stays available to users in its current published state. For more information, see Publish a Virtual Connection and Set Permissions.

To edit a connection, navigate to it from the Explore page. Note that even though database credentials are embedded in the connection, only those with the database credentials can make any changes to a virtual connection.

1. From the dropdown menu, select **All Virtual Connections**, then select the connection you want to edit.
2. Click **Edit Virtual Connection**.
3. Enter the information prompted for to connect. To edit a connection, you must enter the credentials required to access the data.
4. Click **Sign In**.
5. In the virtual connection editor, make your changes and then either save a draft or publish the connection.

**Respond to underlying schema changes**

When the underlying schema in a virtual connection changes—for example, a table is added or deleted, or a column is added or renamed—you must edit the virtual connection to reflect the schema changes and then republish the connection. (If the connection has extracts, remember to refresh the extracts.) This way, you can add or edit the tables, columns, and policies in the connection before new data is exposed to everyone.

**Work with virtual connection revision history**

When you publish a virtual connection, a version is saved in the revision history for Tableau Online. You can revert to a previous version at any time.
To access revision history, you must have a **Creator** site role and the **View** and **Overwrite** permissions.

To see the virtual connection revision history, click the actions menu (….) for the virtual connection, then click **Revision History**.

![Image of Revision History](image)

**Restore or delete a virtual connection revision**

To restore a virtual connection revision, select a revision, and then click **Open**. You are then prompted to discard the existing version of the connection. When you click **Discard and Continue**, the revision you selected becomes the current version of the connection.

![Image of Discard and Continue](image)

To delete a revision, from the revision's actions menu (…), click **Delete**.
Replace an existing data source in a workbook with a virtual connection

For web authoring in Tableau Online or Tableau Server:

1. Download the workbook. For more information, see Download Views and Workbooks in Tableau Desktop Help.
2. In Tableau Desktop, open the workbook and replace its existing data source with a virtual connection. For more information, see Replace Data Sources in Tableau Desktop Help.
3. In Tableau Desktop, upload the workbook to your Tableau Online or Tableau Server site. For more information, see Upload Workbooks to a Tableau Site in Tableau Desktop Help.
4. In Tableau Online or Tableau Server, click Publish to save your changes to the server.

For Tableau Desktop:

1. Open the workbook and replace its existing data source with a virtual connection. For more information, see Replace Data Sources in Tableau Desktop Help.
2. Republish the workbook. For more information, see Simple Steps to Publish a Workbook in Tableau Desktop Help.

Downgrade from Tableau 2022.1 breaks virtual connections

If you upgrade to Tableau 2022.1 and then downgrade to Tableau 2021.4, the virtual connections you created in 2022.1 don’t work in 2021.4 because of permissions issues. The solution is to upgrade to 2022.1 or to recreate the virtual connections in Tableau 2021.4.
Who can do this

To use a virtual connection, you must be a server or site administrator, or Creator.

To edit a virtual connection or data policy, you must

- have credentials to the database that the virtual connection connects to, and
- be a server or site administrator, or a Creator.

To migrate existing content to use a virtual connection, you must

- be a server or site administrator, or
- be a Creator who is also the data source owner.

Tableau Help and Support

- **Get Started**
  
  Learn what Tableau Online can do

- **Quick Help**
  
  Get help with what you’re doing now

- **What’s New Highlights**
  
  Learn what’s new in Tableau Online

- **Training**
  
  Video training and tutorials

- **Troubleshoot**
  
  Troubleshooting and Support articles
Quick Help

Connect to Data

About the Virtual Connection Editor

Add Tables to the Connection

About Data Policies

Create and Test Data Policies

Not finding what you need?

Go online to see all Tableau help

What's New Highlights

**Note:** Innovations are delivered to Tableau Online across a worldwide infrastructure. Access to them might occur earlier or later than announced.

In Tableau Online for June 2022:

- **MFA enforcement for site admins and all new sites:** Multi-factor authentication (MFA) is enabled for site admins on existing sites and all roles for new sites.

- **Connected apps support for OAuth 2.0 trust:** Register an external authorization server (EAS) to establish a trust relationship between Tableau Online and your custom application.

- **REST API authorization using connected apps:** Use Tableau connected apps to programmatically authorize access to the Tableau REST API.

- **Explain Data updates to viewing mode:** Viewing mode is now based on site setting, role, and Explain Data permission. No need to select “Allow Explain Data to be
used in this workbook when viewed online.”

- **Metric’s comparison and date range configuration**: Change comparison, date range, and status indicator at any time.

See full list

**Quick Help Overview**

Delivered in the product, Quick Help shows relevant just-in-time help content based on where you are or what you’re doing in Tableau. From conceptual content to step-by-step instructions, Quick Help provides the answers you need without ever having to leave the product.

To access Quick Help in Tableau:

- Click the help button on the top right of your screen
- Click the Help menu on the toolbar

Quick Help opens, showing the help content for your task. Move the window around or re-size it so you can follow along in the product.
Tableau Online Help

When you move to a new area of the page or change pages, simply click the help button again to refresh the content, or click the related tasks at the bottom of the window to move to a related topic.

Click the Home button to explore all available content options such as Get Started tutorials, training videos, and more.

The Quick Help content in this section is the same content that’s available in the product. If you don’t find what you need in Quick Help when you’re in the product or just want to explore topics in more depth, check out the product help online.

**Note**: You must have an internet connection to access Quick Help in the product. If you are offline or don’t have access to the internet, you can download PDF content for each product help set from the Tableau Help page.

Related tasks

Connect to Data

About the Virtual Connection Editor

Add Tables to the Connection
About Data Policies

Create and Test Data Policies

Not finding what you need?

Go online to see all Tableau help

Connect to Data

Before you can create a virtual connection, you must connect to data.

1. Under Connection, click Create.
2. Choose the connector for your data.
3. Enter the information you’re prompted for.
4. Click Sign In, and then begin creating a virtual connection.

See more about connectors in help online: Supported Connectors

Related tasks

About the Virtual Connection Editor

Not finding what you need?

Go online to see all Tableau help

About the Virtual Connection Editor

Centralize and manage data access for your organization using these features:

- **Virtual connections** – Reusable, managed data access points.
- **Data policies** – Use to set row-level security.
- **Centralized extracts** – Reuse the same extract multiple times.

Use the virtual connection editor to create virtual connections and data policies. The following diagram shows the process:
To get started, select a database, if required. Then, select and drag a table to the **Tables** tab.

**Read full topic**

Related tasks

- Add Tables to the Connection
- About Data Policies
- Create and Test Data Policies

Not finding what you need?

Go online to see all Tableau help
Add Tables to the Connection

On the **Tables** tab:

Add tables to the connection

Add tables

Choose an option:

- **On the left, under Tables**, select tables and double-click or drag them to the **Tables** tab on the right. Include an entitlement table, if you’re using one.
- **Click ** to create a custom table schema.

View and edit table details

1. Select a table in the **Tables** tab.
2. In the **Table Details** section, click a column value to make edits like hide or rename a column, or change the data type.

Select table mode: live or extract

In the top-right of the **Tables** tab, select a **Table Mode**. The mode applies to all tables in the connection.

![Table Mode](image)

**Live Only**- Queried directly from the database. (Live is the default.)

**Extracts Only**- Extracted and saved to Tableau.

- **Click ** to extract the data any time before you publish the virtual connection. 
Tableau Online Help

- Schedule extract refreshes on the virtual connection page after you publish the connection.
  Read schedule extract topic

Set the table visibility state

Use the Visibility toggle to show or hide tables from users.

✅ Users can see table data. Create a policy to govern which data users can see. (Visible is the default.)

☐ Users can’t see table data. You can use hidden tables in a data policy and as an entitlement table.

See table details

Click a table at the top of the Tables tab to see its details below.

Switch the table information you see using these icons:

🔍 Data type for each column.

⚠️ Sample data for each column.

📊 Range of values in a histogram for each column selected.

Quick clip: View your table details.
See **Linked keys** by clicking to see which columns link to other tables. Linked keys show only when databases have primary and foreign key information.

**Publish the connection and set permissions**
Tableau Online Help

Save a draft or publish a connection

Your connection is automatically saved as a draft while you work. Manually save the draft by clicking Draft.

To share a new virtual connection with other users, you need to publish it.

1. Click Publish in the upper right corner of the editor.
2. Type a name for the connection in the Name field.
3. Select a project to save the connection to.
4. Click Publish.

When you edit an existing connection, it remains available to users in its current published state.

- To save updates to a draft, click Draft.
- To make the updated connection available to users, click Publish.

Set permissions so others can use the connection

You’ve published the connection, and you’re ready to let others use it. To do this, set the Connect capability to Allowed.

1. Navigate to the virtual connection.
2. Open the Actions menu (...) and click Permissions.
3. Select the box under the Connect icon so that connect is allowed for all users.
4. Click Save.

Read publish and permissions topic

Read virtual connections topic
About Data Policies

Use a data policy when you want to apply row-level security to one or more tables in the connection. Data policies apply to both live and extract connections.

A data policy has three main components:

A. The tables it applies to, called policy tables. These are the tables that are filtered.
B. The mapped columns that define the relationships between tables (for example, between entitlement and fact tables) and between table columns and policy columns. A policy column is the column used to filter data.
C. The policy condition, which is an expression that is evaluated for every row at query time. When TRUE, the row is shown in the query.

To get started, click [Create New Policy].

Read full topic
Create and Test Data Policies

Use a data policy to filter data in any view, data source, or flow that uses the virtual connection. Use a column in a policy table or an entitlement table to filter the data to only what a user should see.

- **Policy table** - the tables that are filtered.
- **Policy column** - column used to filter the data.
- **Entitlement table** - a table that includes a column you can use to filter the data. Use when policy tables don’t include a policy column.

Add tables to the policy

To create a data policy:

1. Click
2. Click the default name on the tab to rename the policy.
3. Double-click the table name in the left pane to add tables to the data policy.

Map table columns

For each policy table, map a column in the policy table to either a policy column or an
entitlement table.

Map to a policy column

1. Click [Add Column to Map] to add one or more columns to use to filter data.
2. Name the policy column. You'll use this name in the policy condition.
3. For each policy table, use the drop-down menu to select the table column that maps to the policy column.
4. Repeat this process for as many policy columns as you want to use in the policy condition.

Quick clip: Map a table column to a policy column and write a policy condition for a data policy that filters invoices by Salesperson.
Map to an entitlement table

1. Select the entitlement table, drag it to the right and drop it on **Add as Entitlement Table**.
2. For each policy table, click the drop-down menu and select the columns to map the policy table to the entitlement table.
Quick clip: Map an entitlement table (with EmployeeId and Full Name columns) to policy table columns and write a policy condition for the data policy.

Write a policy condition

A policy condition is a calculation that often uses a user function to define row-level access.
More about User Functions in help online.

A policy condition:
- Is required in a data policy.
- Must evaluate to true or false.
- Shows rows when the policy condition is true.

Example:

```
FULLNAME() = [EmployeeName]
```

Test your data policy using Preview as user

Test your policy to see the data as the user sees it and ensure that your policy is working as expected.

1. Select a table.
2. In the Table Details section, select ![With policy applied](https://example.com)
3. Click Preview as user, select a Group (optional) and a User.
4. Verify the policy shows the correct data for that user in the table details.
5. Repeat for other users as needed.

Publish the connection and set permissions

Save a draft or publish a connection

Your connection is automatically saved as a draft while you work. Manually save the draft by clicking ![Save](https://example.com). To share a new virtual connection with other users, you need to publish it.
1. Click Publish in the upper right corner of the editor.
2. Type a name for the connection in the Name field.
3. Select a project to save the connection to.
4. Click Publish

When you edit an existing connection, it remains available to users in its current published state.

- To save updates to a draft, click.
- To make the updated connection available to users, click Publish

Set permissions so others can use the connection

You’ve published the connection, and you’re ready to let others use it. To do this, set the Connect capability to Allowed.

1. Navigate to the virtual connection.
2. Open the Actions menu (…) and click Permissions.
3. Select the box under the Connect icon so that connect is allowed for all users.
4. Click Save.

Read publish and permissions topic

Related tasks

About the Virtual Connection Editor

Add Tables to the Connection

About Data Policies

Not finding what you need?
Tableau Online Help

Go online to see all Tableau help
About Tableau Advanced Management on Tableau Online

Tableau Advanced Management is a collection of features designed to provide enhanced security, manageability, and scalability capabilities for your Tableau Online deployment.

Advanced Management Licensing

Advanced Management is licensed on a per deployment basis.

- Advanced Management can only be used with a Tableau Online deployment. For more information on how to purchase Advanced Management for an existing Tableau Online deployment, contact your account manager.

- If Advanced Management is removed or deactivated for your deployment, you will no longer be able to use the features associated with Advanced Management.

Feature table

The following table lists the features that are included with Advanced Management:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Requirements to use the feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Migration Tool</td>
<td>The Content Migration Tool provides an easy way to copy or migrate content between Tableau projects in your Tableau Online deployment. For more information, see About Tableau Content Migration Tool.</td>
<td>- The Content Migration Tool must be installed on a version of Microsoft Windows that supports .NET 4.6.1 (Windows 7 or later, Windows Server 2008R2 or later).</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Requirements to use the feature</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Activity Log</td>
<td>The Activity Log can send log events to Amazon Simple Storage Service (S3), where you can use them to conduct further auditing and analysis. For more information, see Activity Log.</td>
<td>• Amazon Web Services (AWS) account.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Amazon Simple Storage Service (S3) bucket to receive data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• AWS Key Management Service (KMS) key.</td>
</tr>
<tr>
<td>Admin Insights data retention</td>
<td>Admin Insights data sources retain up to 365 days of site data. For more information, see Use Admin Insights to Create Custom Views.</td>
<td></td>
</tr>
<tr>
<td>Customer-Managed Encryption Keys</td>
<td>Customer-Managed Encryption Keys give you an extra level of security by allowing you to encrypt your site data extracts with a customer managed site-specific key. For more information, see Customer-Managed Encryption Keys.</td>
<td></td>
</tr>
<tr>
<td>Increased Site Capacity</td>
<td>With Advanced Management you get the following capacity increases for your licensed sites:</td>
<td>• Storage of up to 1 Terabyte</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Maximum file size of 25 Gigabytes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up to 25 concurrent Extract refreshes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For more information on site capacity, see Tableau Online Site Capacity.</td>
</tr>
</tbody>
</table>
**Activity Log**

If you have Tableau Online with Advanced Management, you can configure the Activity Log to send log events to Amazon Simple Storage Service (S3) for further analysis and auditing.

With the Activity Log, you can:

- View detailed event data for Tableau Online.
- Capture compliance information and keep track of who is doing what on your Tableau sites.
- Audit permissions changes including:
  - Adding or removing users from a group.
  - Moving a piece of content from one project to another.
  - Explicitly changing the permissions on a piece of content.

You can track permissions change events are essential for implementing a robust book of controls on your Tableau environment. These controls are useful for compliance use cases.

Supplement the information provided by Admin Insights and Admin Views to track site activity and usage metrics.

All events include a timestamp and the ID of the actor that performed the event. If relevant, the ID of the piece of affected content is included with the event.

You can use tools like Splunk and Amazon Cloudwatch to examine the Activity Log. You can use these tools to query log fields and answer questions like:

- What were the 10 actions last taken by a particular user.
- Who last performed an event on a piece of content.
- What was the last action taken on a piece of content.
Set Up Activity Log

The Activity Log contains detailed events for your Tableau deployment that you can use for compliance, monitoring, and auditing. You must complete the following steps in order to use Activity Log.

Prerequisites

To use the Activity Log, you must have the following:

- Tableau Online with Advanced Management
- Amazon Web Services (AWS) account
- Amazon Simple Storage Service (S3) bucket to receive data
  - You’ll create an Amazon S3 bucket as part of the setup process. Amazon S3 is currently the only supported data delivery option.
  - You must create the Amazon S3 bucket in the same AWS region where your Tableau Online site is hosted. For more information about data locations, see Security in the Cloud and Tableau Online IP addresses for data provider authorization.
  - AWS Key Management Service (KMS) key for the Amazon S3 bucket that you create during setup.

Step 1. Create an AWS account

If you don’t already have an Amazon Web Services (AWS) account, you can sign up for an AWS account at the AWS website.

Step 2. Create an Amazon S3 bucket and set up permissions

1. Create an Amazon S3 bucket to receive your log data. For more information, see Creating a bucket at the AWS website.

2. Configure the Amazon S3 bucket with the following settings:
a. Under **Object Ownership**, select **ACLs disabled** (recommended). This ensures that the bucket owner is the owner of all objects written to it.

b. Under **Bucket Versioning**, select **Enable**. Bucket versioning must be enabled in order to replicate objects.

c. Under **Default encryption**, select **Enable**.

d. Choose **AWS Key Management Service (SSE-KMS)**.

e. Choose **Enter AWS KMS key ARN**.

f. Click the **Create key** button that appears to create a new AWS Key Management Service (KMS) key.

g. Select **Symmetric Key** type and **Encrypt and decrypt Key usage**.

h. Name the key with an alias, and then click through until the **Review** page.

i. Add the following statement to the **Statement list** inside the Key policy, to give Tableau access to encrypt objects in the S3 bucket. Replace account-number-provided-by-Tableau/role-provided-by-Tableau with the account number/role provided by Tableau, respectively.

   **Note:** This statement allows the Tableau IAM role to encrypt the objects placed in the Amazon S3 bucket. “kms:GenerateDataKey” is used to generate a data key to encrypt object replicas. “kms:Encrypt” is used to encrypt object replicas created in the target S3 bucket. “Resource”: “*” grants permission for the KMS key only to the replication role and doesn’t allow the role to elevate its permissions. For more information see Protecting data using server-side encryption with AWS Key Management Service (SSE-KMS) at the AWS website.
j. Click Finish to create the KMS key.

k. Click Create bucket to create the Amazon S3 bucket.

3. Update permissions on the Amazon S3 bucket policy.

   a. Open the Amazon S3 bucket and click the Permissions tab.

   b. Locate the Bucket policy section and click Edit.

   c. Add the following to the Statement list in the bucket policy. Replace S3-BUCKET-NAME with the name of the bucket and account-number-provided-
by-Tableau/role-provided-by-Tableau with the account number/role provided by Tableau, respectively.

**Note:** This statement allows the Tableau IAM role to replicate objects into the bucket. Using "*" and "<path>/*" grants access to all prefixes in the specified bucket and path in the bucket, respectively. The "s3:ReplicateObject" and "s3:ReplicateDelete" permissions are the minimum permissions required to successfully replicate objects and delete markers. See [Granting permissions when the source and destination buckets are owned by different AWS accounts](https://aws.amazon.com) at the AWS website.

```
{
  "Sid": "TableauS3ReplicationRoleAccess",
  "Effect": "Allow",
  "Principal": {
    "AWS":
      "arn:aws:iam::account-number-provided-by-Tableau:role/role-provided-by-Tableau",
    "Action": [
      "s3:ReplicateObject",
      "s3:ReplicateDelete"
    ],
    "Resource": [
      "arn:aws:s3:::S3-EXAMPLE-NAME",
      "arn:aws:s3:::S3-EXAMPLE-NAME/*"
    ]
  }
}
```
d. Click **Save changes**.

Step 3. Gather the following AWS information to set up Activity Log

- The AWS account number: 061095916136
- The name of the Amazon S3 bucket created above.
- The Amazon Resource Name (ARN) of the AWS Key Management Service (KMS) key created above: `arn:aws:iam::061095916136:role/prod-replication-rule-role`.

Step 4. Configure Tableau Online

1. Navigate to your Tableau site.
2. On the **Settings** page, select the **Integrations** tab.
3. In the **Activity Log** section, select the **Enable** button.
4. In the **Set Up Connection** dialog box, enter the following information:
   a. In the **AWS account number** box, enter the 12-digit AWS account number.
   b. In the **S3 bucket name** box, enter the name of the Amazon S3 bucket. This must be a valid name according to AWS bucket name requirements.
   c. In the **KMS key ARN** box, enter the KMS key Amazon Resource Name (ARN). The account number in the ARN must match the provided AWS account number, and be of valid format (i.e. `arn:aws:kms:<region>::<account-id>::key/<key-id>`).
5. Click **Submit**.
The connection status column will show In progress as the system attempts to replicate a text file to the target Amazon S3 bucket to test the connection.

After the file has been successfully replicated to the target Amazon S3 bucket, the connection status column will state Pending verification and display a widget to input 'Test file contents'. You might need to refresh the page to see updates.

Verify security file replication

1. Go to the target Amazon S3 bucket and find the folder beginning with siteLuid (the remainder of the name is the site’s unique identifier).

2. Find the text file named SECURITY_VERIFICATION_FILE.txt.

3. Download and open the text file.

4. Copy the text content inside the file.

5. Return to the Settings page and paste the text contents into the Text file contents input field, and then click Submit.

6. If the submitted content is correct, the connection status changes to Active. Activity Log is now enabled, and data will begin to replicate to the target Amazon S3 bucket.

7. If the submitted content is incorrect, an error message will be displayed. Check that the content was copied correctly without extra characters or spaces.

Troubleshooting

Security verification file not appearing?

- The file could take up to 15 minutes to appear in the target Amazon S3 bucket due to Amazon S3 limitations.

  If the connection status says "In progress", the file is still attempting to replicate. For more information, see Troubleshooting replication at the AWS website.

- A connection status of Failed means that the file was unable to replicate successfully.
Confirm that the permissions on the Amazon S3 bucket policy and the AWS Key Management Service (KMS) key policy contain the appropriate statements. For more information, see the following topics at the AWS website:

- Troubleshooting replication
- Configuring replication when source and destination buckets are owned by different accounts
- I set up replication between my buckets, but new objects aren’t replicating. How can I troubleshoot this?

Audit Permissions Using the Activity Log

Any changes to content explicit permissions as well as permission default templates (such as a project's workbook permission template) are actions that are written to the Activity Log. These actions include:

- Changes to explicit permissions and default permission templates via Permissions Dialog UI.

- Changes to explicit permissions and default permission templates via REST API (specifically, the "add" and "delete" APIs. For more information, see Permissions Methods).

- System actions that indirectly result in a change in permissions. System actions that can change explicit permissions include things such as when a piece of content is deleted, the system will automatically delete any permissions associated with it.

Only changes to User Rules and Group Rules mentioned here are part of the Permissions Audit History Logs and any changes to other parts of the calculation are not included. Any changes to explicitly assigned permissions rules are saved in logs. We track:

- When the change was made.

- The id of the user that made the change.

- The id of the site that the change was made on.
• The id and type of the content that the change was made on.

• What the change was (what the new capability values are).

For more information about effective versus explicit permissions, see Effective permissions.

Log format

Every action that is an explicit permissions change will get a log entry. Each log entry is structured in a JSON format, with specific keys representing different parts of information. Each log entry contains two parts: metadata about the action and what the action was. Activity Log entries in the logs are not formatted nor are the keys sorted in any specific order.

Metadata about the action

Metadata about the action includes information about when and where the action occurred, as well as what user performed the action. Metadata will have the following keys:

ver: the version of the data in the message and format of the data. Starting from 1.1.0. The first digit can be incremented if this general data schema changes, the second if the storage specific message changes (ie. we change only how log data is stored), and the third if there is a non-breaking change.

• ts: Timestamp, UTC ISO8601, ending with Z including milliseconds.

• tz: Local timezone of the host, like https://www.timeanddate.com/time/zones/.

• hn: hostname of the service that emitted the event. As it is always vizportal, this is left blank.

• svc: product or service this log line represents (the value will be “Tableau Server”).

• status: the state the request is in: either “ATTEMPT“ or ”SUCCESS“.

• k: the type of event being recorded. Possible values include:
CreatePermissionsAuditEvent - occurs when permissions are added via Add Permissions REST APIs

UpdatePermissionsAuditEvent - occurs when changing explicit permissions via Permission Dialog UI. This is also used when the "delete" action is selected from the permission dialog UI.

UpdatePermissionTemplatesAuditEvent - occurs when changing explicit permissions templates via Permission Dialog UI. This is also used when the "delete" action is selected from the permission dialog UI.

DeleteAllPermissionsAuditEvent - occurs when the system deletes permissions as a result of a different action, such as when a piece of content is deleted, its explicit permission records also also all deleted.

DeletePermissionsAuditEvent - occurs when deleting permissions via Delete Permissions REST APIs.

v: the specific data of the event being recorded.

Action

The action itself contains information about what piece of content had its permissions changed, what capabilities were changed, and to what values the capabilities were changed. The type of action falls under the k key above, and further information falls under the v key.

The keys for this information under v are the following. Note that not all fields are required, some only apply to certain values of the "k" keys.

p: the permissions data, this itself contains more JSON data:

- authorizableType: the type of content that had its permissions changed. Values are "PROJECT", "WORKBOOK", etc.

- contentIds: a list of the content ids that had their permissions changed.

- templateType: this value is present when a project’s content-type template is
changed. For instance, if the Values are "WORKBOOK", etc.

- `explicitPermissions`: a list of JSON data containing what capabilities and for which grantee

- `granteeType`: "Group" or "User".

- `granteeId`: the id of the user or group for whom permissions were changed.

- `capability`: a JSON to identify the capability that was changed
  
  - `id`: the id of the capability, maps to the ids in the postgres table capabilities.
  
  - `value`: the name of the capability as found in the postgres table capabilities.

- `value`: the value that the capability was changed to. Values can include "GROUP_DISALLOW", "GROUP_ALLOW", "USER_DISALLOW", and "USER_ALLOW".

- `unspecifiedPermissions`: permissions that are changed from Allow/Deny to unspecified via the Permission Dialog UI.
  
  - `granteeType`: "Group" or "User".
  
  - `granteeId`: the id of the user or group for whom permissions were changed.

  - `capability`: a JSON to identify the capability that was changed
    
    - `id`: the id of the capability, maps to the ids in the postgres table capabilities.
    
    - `value`: the name of the capability as found in the postgres table capabilities.

    - `value`: the value that the capability was changed to. In unspecifiedPermissions, this value is always "unspecified".

- `au`: JSON data representing which authenticated user took the action.
• siteId: id of the site of the user.

• userId: id of the user that took the action. A value of 0 means that the system made this action, not an actual user.

Activity Log Event Type Reference

The following tables describe the Activity Log event types and attributes.

Attributes common to all event types

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>traceUuid</td>
<td>string</td>
<td>Auto-generated UUID identical across all the events in a batch, such as multiple permissions changed by a single user action</td>
</tr>
<tr>
<td>actorUserId</td>
<td>integer</td>
<td>Integer user ID of user who performed the action that initiated the event</td>
</tr>
<tr>
<td>eventTime</td>
<td>string</td>
<td>Timestamp string</td>
</tr>
<tr>
<td>impersonatedUserId</td>
<td>integer</td>
<td>Integer user ID of user who is impersonated to perform the action that initiated the event, if impersonation occurred</td>
</tr>
<tr>
<td>serviceName</td>
<td>string</td>
<td>Name of service that emitted the event (e.g., vizportal, vizqlserver, sitesaml (outside monolith))</td>
</tr>
<tr>
<td>siteLuid</td>
<td>string</td>
<td>Site LUID of Tableau site where event took place</td>
</tr>
</tbody>
</table>

Event types

<table>
<thead>
<tr>
<th>Event Type</th>
<th>Attribute Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delete_permissions_grantee</td>
<td>granteeld</td>
<td>integer</td>
<td>The integer identifier of the grantee.</td>
</tr>
<tr>
<td>Function</td>
<td>Parameter</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>delete_permissions</td>
<td>granteeType</td>
<td>string</td>
<td>The type of Grantee, either user or group.</td>
</tr>
<tr>
<td>update_permissions</td>
<td>permissionType</td>
<td>string</td>
<td>The permission type, either explicit or unspecified.</td>
</tr>
<tr>
<td>update_permissions</td>
<td>authorizableType</td>
<td>string</td>
<td>The type of content that had its permissions changed, such as project or workbook.</td>
</tr>
<tr>
<td>update_permissions</td>
<td>contentId</td>
<td>integer</td>
<td>The integer ID of the content that had the permissions updated.</td>
</tr>
<tr>
<td>update_permissions</td>
<td>capabilityId</td>
<td>integer</td>
<td>The integer ID of the capability. A capability is the ability to perform a certain action on a particular piece of content, such as view, filter, download or delete.</td>
</tr>
<tr>
<td>update_permissions</td>
<td>capabilityValue</td>
<td>string</td>
<td>The string describing the capability.</td>
</tr>
<tr>
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<td>update_permissions</td>
<td>granteeValue</td>
<td>string</td>
<td>The updated permissions value, such as 'user allow' or 'Group allow'.</td>
</tr>
<tr>
<td>create_permissions</td>
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</tr>
<tr>
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<td>granteeValue</td>
<td>string</td>
<td>The updated permissions value, such as 'user allow' or 'Group allow'.</td>
</tr>
<tr>
<td>delete_all_permissions</td>
<td>authorizableType</td>
<td>string</td>
<td>The type of content that had its permissions changed, such as project or workbook.</td>
</tr>
<tr>
<td>delete_all_permissions</td>
<td>contentId</td>
<td>integer</td>
<td>The integer ID of the content that had the permissions updated.</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>update_permissions_template</td>
<td>permissionType</td>
<td>string</td>
<td>The permission type, either explicit or unspecified.</td>
</tr>
<tr>
<td>update_permissions_template</td>
<td>authorizableType</td>
<td>string</td>
<td>The type of content that had its permissions changed, such as project or workbook.</td>
</tr>
<tr>
<td>update_permissions_template</td>
<td>templateType</td>
<td>string</td>
<td>The type of Permission Template used to change permissions, such as workbook or datasource.</td>
</tr>
<tr>
<td>update_permissions_template</td>
<td>contentId</td>
<td>integer</td>
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</tbody>
</table>
Customer-Managed Encryption Keys

Customer-Managed Encryption Keys gives you an extra level of security by allowing you to encrypt your site data extracts with a customer managed site-specific key. The Salesforce Key Management System (KMS) instance stores the default site-specific encryption key for anyone who enables encryption on a site.

Encryption Process

The encryption process follows a key hierarchy. First, Tableau Online encrypts an extract. Next, Tableau Online KMS checks its key caches for a suitable data key. If a key isn't found, one is generated by the KMS GenerateDataKey API, using the permission granted by the key policy that's associated with the key. AWS KMS uses the CMK to generate a data key and returns a plaintext copy and encrypted copy to Tableau Online. Tableau Online uses the plaintext copy of the data key to encrypt the data and stores the encrypted copy of the key along with the encrypted data.

Enable Encryption

After you enable encryption, Tableau Online will create a job for every extract on your site to get encrypted. These jobs are the lowest priority. Any previously set extract job runs before the encrypted extracts job. When there are extra resources, these jobs run encryption on all extracts without needing to be refreshed.

To enable encryption complete the following steps.

1. Select the General tab.
2. Under Extract Encryption, select the checkbox next to Enable encryption of extract refreshes.
3. Read the confirmation message and select OK to continue.
4. Select Save. A confirmation message or an error message appears.
**Create a Key**

Creating a key replaces and archives the current key. The new key is used for encryption in all future data extracts on your site. You can view the details of your previous key by downloading the log.

**Note:** Your key is tied to your Tableau Online region.

To create a key complete the following steps.

1. Select the **General** tab.
2. Under **Extract Encryption**, in **Actions**, select **Create A Key**.
3. Select **Create A Key** or **Cancel**. A confirmation message appears.

**Generate and Rotate a Key**

You can rotate a key on your company’s schedule for extra security. Rotating a key creates a new key based on the original key.

**Note:** If there is a long refresh rate or if the extract isn’t refreshed, the extract is encrypted with the last active key instead of the new key.

To rotate a key complete the following steps.

1. Select the **General** tab.
2. Under **Extract Encryption**, in **Actions**, select **Generate and Rotate Key**.
3. Select **Generate and Rotate Key** or Cancel. A confirmation message appears.
Disable Encryption

You can turn off encryption by contacting your account manager. If your Advanced Management license is inactive, your extracts remain decrypted until it’s reactivated.

Delete a Key (Non-Recoverable Data Extracts)

**Warning:** If you delete a key, there isn't a way to regain access to the data extracts.

Delete the key only if there’s a dire security incident. You can't access your data extracts after you have deleted the key. Any data extracts tied to the deleted key are permanently unavailable.

**Note:** If you want to disable the encryption and keep your key see Disable Encryption.

To delete a key complete the following steps.

1. Select the **General** tab.
2. Under **Extract Encryption**, in **Actions**, select **Delete**.
3. In the text field, enter **Delete Key**.

**Warning:** You can't access your data extracts after you have deleted the key. Delete the key only if there’s a dire security incident.

4. Choose **Delete Encryption Key** or **Cancel**. A confirmation or error message appears.

Audit Logs

You can download audit logs to review operations performed on your keys including creation, rotation, deletion, decryption, and downloading logs. The audit log also includes the following information.

- Date and Time
- Event Type
- Success or Failure
- Authenticated Identity of calling service
Frequently Asked Questions (FAQ)

Question:
What happens if I don’t renew my Advanced Management license?

Answer:
If you don’t renew the Advanced Management license, the Customer-Managed Encryption Keys feature automatically changes to a disabled state.

Question:
What happens to my key data if I stop being a Tableau Online customer?

Answer:
Per the Tableau Online data policy, there’s a 90-day wait period before your key data gets deleted.

Question:
What happens if I move to a different Tableau Online region?

Answer:
The key data is in the Salesforce (KMS) instance that’s in the same region as your Tableau Online pod. If you want to move to another region, you must turn off the feature and run your extracts first.

About Tableau Content Migration Tool

This set of articles guides you through setting up, using, and maintaining the Tableau Content Migration Tool.
What is Content Migration Tool?

The Content Migration Tool provides an easy way to copy or migrate content between projects. The Content Migration Tool user interface walks you through the steps necessary to build a "migration plan" that you can use once or as a template for multiple migrations.

Note: If you have a Tableau Server deployment, you can migrate content between projects on a Tableau Server installation and a Tableau Online site. Both deployments must have a valid Advanced Management license.

Before migrating content, we recommend reviewing the Content Governance section in Tableau Blueprint.

Help and Support

If you have problems that you cannot solve with this documentation, contact Tableau Technical Support.

Getting Started with Tableau Content Migration Tool

This article will help you get started with the Tableau Content Migration Tool. It contains links to other articles about information you need to prepare before installing the Content Migration Tool, and steps to design a migration plan and upgrade existing installations.

Pre-installation

Installation requirements

The Content Migration Tool can only be installed on Windows operating systems. Before installing, you must be able to connect to the Tableau source site (the site you are migrating from) and the destination site (the site you are migrating to) from the computer where Content Migration Tool is installed. Both the source and destination sites must have a valid
Advanced Management license. For more information, see Install Tableau Content Migration Tool.

Compatibility with Tableau Online

Content Migration Tool versions 2022.2.1 and later support content migration for all Tableau Online deployments. To download the latest installer, see the Advanced Management release page.

Compatibility with Tableau Server

The Content Migration Tool supports content migration for Tableau Server versions 2019.3 and later.

The table lists compatible versions of Tableau Server based on the installed version of Content Migration Tool.

<table>
<thead>
<tr>
<th>CMT Version</th>
<th>Tableau Server Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022.2.x</td>
<td>2020.3.x - 2022.2.x</td>
</tr>
<tr>
<td>2022.1.x</td>
<td>2020.2.x - 2022.1.x</td>
</tr>
<tr>
<td>2021.4.x</td>
<td>2020.1.x - 2021.4.x</td>
</tr>
<tr>
<td>2021.3.x</td>
<td>2019.4.x - 2021.3.x</td>
</tr>
<tr>
<td>2021.2.x</td>
<td>2019.3.x - 2021.2.x</td>
</tr>
<tr>
<td>2021.1.x</td>
<td>2019.3.x - 2021.1.x</td>
</tr>
<tr>
<td>2020.4.x</td>
<td>2019.3.x - 2020.4.x</td>
</tr>
<tr>
<td>2020.3.x</td>
<td>2019.3.x - 2020.3.x</td>
</tr>
<tr>
<td>2020.2.x</td>
<td>2019.3.x - 2020.2.x</td>
</tr>
<tr>
<td>2020.1.x</td>
<td>2019.3.x - 2020.1.x</td>
</tr>
<tr>
<td>2019.4.x</td>
<td>2019.3.x - 2019.4.x</td>
</tr>
</tbody>
</table>
Tableau Online Help

<table>
<thead>
<tr>
<th>CMT Version</th>
<th>Tableau Server Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019.3.x</td>
<td>2019.3.x</td>
</tr>
</tbody>
</table>

**Note:** If you have a Tableau Server deployment, you can migrate content between projects on a Tableau Server installation and a Tableau Online site. Both sites must have a valid Advanced Management license.

Compatibility with Tableau content

The Content Migration Tool supports migrating workbooks and published data sources saved in the eight most recent versions of Tableau. While you can migrate existing data sources, only data sources that use the connection types in the table below can be changed and modified during migration. For more information, see Data Source Transformations in Migration Plans: Workbooks and Migration Plans: Published Data Sources.

<table>
<thead>
<tr>
<th>Actian Matrix</th>
<th>Google Drive</th>
<th>Pivotal Greenplum Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actian Vectorwise</td>
<td>HortonWorks Hadoop Hive</td>
<td>PostgreSQL</td>
</tr>
<tr>
<td>Amazon Athena</td>
<td>HP Vertica</td>
<td>Progress OpenEdge</td>
</tr>
<tr>
<td>Amazon Aurora</td>
<td>IBM DB2</td>
<td>Salesforce</td>
</tr>
<tr>
<td>Amazon EMR</td>
<td>IBM Netezza</td>
<td>SAP HANA</td>
</tr>
<tr>
<td>Amazon Redshift</td>
<td>Map R Hadoop Hive</td>
<td>SAP Sybase ASE</td>
</tr>
<tr>
<td>Apache Drill</td>
<td>Microsoft Access</td>
<td>SAP Sybase IQ</td>
</tr>
<tr>
<td>Aster Database</td>
<td>Microsoft Analysis Services</td>
<td>Snowflake</td>
</tr>
<tr>
<td>Box</td>
<td>Microsoft Excel</td>
<td>Spark SQL</td>
</tr>
<tr>
<td>Cloudera Hadoop</td>
<td>Microsoft Excel Direct</td>
<td>Statistical File</td>
</tr>
</tbody>
</table>
Post-installation

Limitations when migrating content

Before you start, make sure you understand the limitations when migrating content using the Content Migration Tool. For more information, see Migration Limitations.

Create a migration plan

The Content Migration Tool walks you through migrating content across projects on a single site, to a new site on the same Tableau Server instance, and to sites that exist on different Tableau Server instances. The plan you create can be saved and used again for future migrations. For more information, see Migration Plan Overview.

Upgrading Content Migration Tool

For instructions on how to upgrade Content Migration Tool, see Upgrade Tableau Content Migration Tool.

Install Tableau Content Migration Tool

Installing Tableau Content Migration Tool is straightforward and easy.
Installation requirements

The Content Migration Tool tool is run from a Windows computer and can connect to Tableau Online sites and Tableau Server 19.3 and later with a valid Advanced Management license. For more information about compatible versions, see Getting Started with Tableau Content Migration Tool.

The computer that you install Content Migration Tool on must meet the requirements below:

- Microsoft Windows 8 or newer (x64)
- Intel Core i3 or AMD Ryzen 3 (Dual Core)
- 4 GB memory or larger
- Can connect to the source and destination sites. Both sites must have a valid Advanced Management license to migrate content.
- 2 GB HDD or larger. The drive where the \temp folder resides must have enough disk space to hold a copy of all content being migrated in a single migration. All content is stored locally on the disk and deleted when the migration is complete.
- Have enough free disk space to hold the application and its logs.

In addition, confirm that the REST API is enabled on Tableau Server (this is the default). Use the tsm configuration get -k api.server.enabled command to confirm this. A return value of true means the REST API is enabled. To enable the REST API, use the tsm configuration set command. For more information, see api.server.enabled in Tableau Server help.

Installing Content Migration Tool

To install the Content Migration Tool:

1. Download the Content Migration Tool installer (Tabcmt-64bit-<version>.exe) from the Advanced Management release page.
2. Run the Content Migration Tool Setup program.

*Note:* Running the Content Migration Tool Setup program will overwrite the previous version.

3. After reading the EULA, select **I agree to the license terms and conditions**, and click **Install**.

4. If the User Account Control dialog opens, click **Yes** to allow the installer to make changes.

**Who can do this**

A user with Administrator access on the machine.

**Upgrade Tableau Content Migration Tool**

Upgrading Tableau Content Migration Tool is straightforward and easy.

**Before Upgrading**

- Running the Content Migration Tool Setup program will overwrite the previous version.
- Content Migration Tool does not support side-by-side installation of previous versions.

**Upgrading Content Migration Tool**

**To upgrade Content Migration Tool:**

1. Download the latest Content Migration Tool installer (`Tabcmt-64bit-<version>.exe`) from the Advanced Management release page.

2. Run the Content Migration Tool Setup program.

3. After reading the EULA, select **I agree to the license terms and conditions**, and
Tableau Online Help

4. If the User Account Control dialog opens, click Yes to allow the installer to make changes.

Who can do this

A user with Administrator access on the machine.

Using Tableau Content Migration Tool

The following steps are designed to guide you through using the Tableau Content Migration Tool:

- Migration Plan Overview
  - Migration Plans: Sites
  - Migration Plans: Source Projects
  - Migration Plans: Workbooks
  - Migration Plans: Published Data Sources
  - Migration Plans: Permissions and Ownership
  - Migration Plans: Migration Scripts
  - Migration Plans: Plan Options
- Using the Tableau Content Migration Tool Console Runner

Tableau Content Migration Tool Use Cases

Tableau Content Migration Tool as the name suggests, is primarily used for moving Tableau Online content from one project to another. However, there are many features in the tool that makes it ideal for accomplishing several tasks related to content migration and maintenance.

Note: In many of the use cases we use the term migration to describe moving content from one environment, site, or project to another. However, technically the Content Migration Tool copies content and does not automatically delete or archive the original or source content.
The information below describes some common use cases where you can leverage the Content Migration Tool.

Content promotion

You can use the Content Migration Tool to create content for development projects and then perform routine migrations to promote content to staging or production projects on your site.

Use the following steps to migrate content to production projects:

1. **Create a plan** and select the site to use as your source. In this example, we describe a migration between projects on the same site, so choose the same Tableau site as your destination. For more information, see Create a Plan in Migration Plan Overview topic.

   When migrating workbooks between two projects on the same site, your sign-in credentials for the source and destination may be similar or identical. In this scenario, we recommend using personal access tokens for a more reusable connection. For more information, see Personal Access Tokens.

2. **Select the development project** with the content you want to migrate. You can select entire projects, specific workbooks and data sources, and user permissions. For more information, see Planning in Migration Plan Overview topic.

   If you need to make any **changes or transformations** to the content during this migration, you can configure that in the plan as well. This is referred to as **Mapping**.

3. Select **Change Project** from the **Add Mapping** menu to add a project mapping. Select your development project as the source and production project as the destination, or click **Add New** to create a new project.

Other types of mapping include:
• **Changes to workbooks:** Includes renaming workbooks and changing the destination project. For a full list of workbook transformations, see Migration Plans: Workbooks.

• **Changes to data sources:** Includes replacing table or schema names, settings calculation formulas, and setting connection information. For a full list of data source transformations, see Migration Plans: Workbooks (embedded data sources) and Migration Plans: Published Data Sources (published data sources).
• **Changes to Users:** Includes domain, user, and group name changes in the destination.

4. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.

5. **To schedule** this to run regularly, you can script this as a job using the Content Migration Tool Runner and schedule it. For more information on using the Content Migration Tool Runner, see Using the Tableau Content Migration Tool Console Runner.

**Tailoring content for customers**

When working in a consulting scenario, you can customize content for each of your customers using the Content Migration Tool. Each workbook functions as a template for your migration plan, allowing you to apply styling (text, images, etc.) and replace data sources for specific customers.

In this example, we describe a migration between projects; an internal project where you store templates, and an external project you share with customers.

**Use the following steps to customize content for your customers:**
1. **Create a plan** and select the site to use as your source. Choose the same Tableau site as your destination. For more information, see Create a Plan in Migration Plan Overview topic.

When migrating workbooks between two projects on the same site, your sign-in credentials for the source and destination may be similar or identical. In this scenario, we recommend using personal access tokens for a more reusable connection. For more information, see Personal Access Tokens.

2. **Select the internal project** that contains the template content you want to migrate. You can select entire projects, specific workbooks and data sources, and user permissions. For more information, see Planning in the Migration Plan Overview.

   If you need to make any **changes or transformations** to the content during this migration, you can configure that in the plan as well. This is referred to as **Mapping**.

3. Select **Change Project** from the **Add Mapping** menu to add a project mapping. Select your internal project as the source and external project as the destination, or click **Add New** to create a new project.

4. **In the Workbooks** step of the Migration Plan, use workbook mappings and transformations to customize your content. Below are two examples of frequently used transformations. For a full list of workbook transformations, see Migration Plans: Workbooks.

   - To personalize content, you can use the **Replace Image** and **Replace Text** transformations to update the workbook with a customer’s company name and logo.

   - When it comes to data sources, you can use the **Replace Table/Schema Name** or **Set Custom SQL** transformations to modify content for your customer.

5. **Verify and run** the plan. When you are ready, click **Run Migration** to end the
Planning phase and prepare to run your plan.

Environment migration

You can use the Content Migration Tool to migrate content between Tableau Online and Tableau Server environments with a valid Advanced Management license.

Use the following steps to migrate content between Tableau deployments:

1. **Create a plan** and **select the site** you want to migrate from as your source. For more information, see Create a Plan in Migration Plan Overview topic.

2. **Select the content** you want to migrate from your source site. You can select entire projects, specific workbooks and data sources, and user permissions.

3. **Create user permissions mappings** to customize and secure content. For more information, see Migration Plans: Permissions and Ownership.
4. **Verify and run** the plan. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.

**Tips**
- Before you perform an environment migration, make sure you understand the Migration Limitations when using the Content Migration Tool.
- You can migrate your content in stages to test and validate content iteratively before the final migration is complete.
- Content Migration Tool migration does not handle embedded credentials, subscriptions, and custom views. These will have to be migrated manually.

**External content sharing**

You can use the Content Migration Tool to share internal content with external collaborators, without allowing access to your project. This keeps your data secure and allows you to publish only select workbooks and data sources. Once content has been shared, collaborators sign in to their Tableau Online site to view and make changes, without affecting content stored on your internal project.

Before you continue, make sure the content you are sharing is compatible between the internal and external projects.

**Use the following steps to share content externally:**

1. **Prepare internal content.** As a best practice, we recommend separating content on the internal project, with locked permissions and strict governance rules. Workbooks and data sources should be clearly labeled to indicate the content is for external use. For more information, see Use Projects to Manage Content Access.

   **Note:** Content shared with external projects must use data extracts unless the data source is publicly accessible. For information about creating extracts and
If you have implemented row level security, those data sources must be updated to reflect user filters and other details for the external project. For more information about row level security, see *Restrict Access at the Data Row Level* in Tableau Desktop help.

2. **Create a plan** and select the site to use as your source. Choose the same Tableau site as your destination. For more information, see *Create a Plan in Migration Plan Overview* topic.

   When migrating workbooks between two projects on the same site, your sign-in credentials for the source and destination may be similar or identical. In this scenario, we recommend using personal access tokens for a more reusable connection. For more information, see *Personal Access Tokens*.

3. **Select the internal project** that contains the template content you want to migrate. You can select entire projects, specific workbooks and data sources, and user permissions. For more information, see *Planning in the Migration Plan Overview*.

   If you need to make any **changes or transformations** to the content during this migration, you can configure that in the plan as well. This is referred to as *Mapping*.

4. Select **Change Project** from the **Add Mapping** menu to add a project mapping. Select your internal project as the source and external project as the destination, or click **Add New** to create a new project.

5. **Verify and run** the plan. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.
Validating database migrations

This use case is when you intend to validate content after a migration of the underlying databases. One example of database migration is moving from SQL Server to Snowflake. CMT can help you validate the content built from both data sources is the same before you finalize your migration, but it cannot perform the actual database migration.

Use the following steps to validate database migrations:

1. **Create a plan** and select the site to use as your source. Choose the same Tableau site as your destination. For more information, see Create a Plan in Migration Plan Overview topic.

2. **Select the content** you want to change the data source or database connections.

3. **Configure the migration** to copy your content to a new project. Let’s call the **source** project as **Project A**, and the new or the **destination** project as **Project B**.
   - Changes to workbooks: Create a workbook mapping to change Project A to Project B. For a full list of workbook transformations, see Migration Plans: Workbooks.
   - Changes to data sources: Create a data source mapping to change the Project A to Project B. For a full list of data source transformations, see Migration Plans: Published Data Sources.

4. **Verify and run** the plan. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.

5. **Update the content** in **Project B** with the new database connections or replace the data sources. This needs to be done manually by authoring.

6. **Test each workbook** in **Project A** with the copy in **Project B** and review for any inconsistencies in the data due to the change in data source.

7. Once you have confirmed everything is working as expected, **overwrite the content**
in Project A with the updated content in Project B.

**Note:** If the content already exists in the destination project and you do not select the *Overwrite Newer Workbooks* and *Overwrite Newer Data Sources* publish options, the content will not be copied to the destination project.

### Maintenance tasks

You can use the Content Migration Tool to perform a variety of maintenance tasks.

**Tagging stale content**

Using the Content Migration Tool, you can manage archiving stale content. For example, you can build a plan that runs on a regular schedule that can automatically pick up content tagged as Stale Content and move it to an Archive project. After a certain amount of time, the content in this project can be purged from the system. For more information see, Migration Plans: Workbooks.

**Restoring content**

You can use the Content Migration Tool to restore content removed (accidentally or purposefully) from a project with content from a backup project.

**Use the following steps to restore content from a backup project:**

1. **Create a plan** and select the site to use as your source. Choose the same Tableau site as your destination. For more information, see Create a Plan in Migration Plan Overview topic.

2. **Select the content** you want to restore from the backup project.

3. **Configure the migration** to restore content from your backup project. Let’s call the backup project **Project A** and the project you want to restore to **Project B**.
Tableau Online Help

- Changes to workbooks: Create a workbook mapping to change Project A to Project B. For a full list of transformations, see Migration Plans: Workbooks.

- Changes to data sources: Create a data source mapping to change Project A to Project B. For a full list of data source transformations, see Migration Plans: Published Data Sources.

4. **Verify and run** the plan. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.

5. **Review the content** on the production site.

Partial backup

Once you have a backup project, you can use the Content Migration Tool to transfer new content from production to the backup project.

**Notes:**
- Before you perform a partial backup, make sure you understand the Migration Limitations when using the Content Migration Tool.
- The Content Migration Tool shouldn't be used to backup your entire site. We recommend prioritizing the content you need most.

**Use the following steps to perform a partial backup of your content:**

1. **Create a plan** and select the site to use as your source. Choose the same Tableau site as your destination. For more information, see Create a Plan in Migration Plan Overview topic.

2. **Select the content** you want to backup from the production project. You can select entire projects, specific workbooks and data sources, and user permissions. To migrate only new content, make sure the publish options **Overwrite Newer Workbooks** and **Overwrite Newer Data Sources** are not selected. For more information,
3. **Configure the migration** to copy content to your backup project. Let's call the source project **Project A** and the backup project **Project B**.

   - Changes to workbooks: Create a workbook mapping to change Project A to Project B. For a full list of transformations, see Migration Plans: Workbooks.

   - Changes to data sources: Create a data source mapping to change Project A to Project B. For a full list of data source transformations, see Migration Plans: Published Data Sources.

4. **Verify and run** the plan. When you are ready, click **Run Migration** to end the Planning phase and prepare to run your plan.

5. **To schedule** this to run on a regular basis, you can script this as a job using the Content Migration Tool Runner and schedule it. For more information on using the Content Migration Tool Runner, see Using the Tableau Content Migration Tool Console Runner.

**Migration Plan Overview**

Tableau Content Migration Tool creates a streamlined process for migrating Tableau content between projects. The easy-to-follow plan can be audited, is repeatable, and works via a batch process so any number of workbooks and data sources can be migrated in a simple and efficient process.

The Content Migration Tool will display contextual tips to walk you through creating or editing a migration plan. Once you select the source and destination sites, a summary of your migration will be displayed at the top of the screen as follows:

Migrating from [http://admin@win-vj23dhwudie80/#/site/Accounting-sandbox](http://admin@win-vj23dhwudie80/#/site/Accounting-sandbox) to [http://admin@win-vj23dhwudie80/#/site/Accounting](http://admin@win-vj23dhwudie80/#/site/Accounting)
Limitations when migrating content

Before you start, make sure you understand the limitations when migrating content using the Content Migration Tool. For more information, see Migration Limitations.

Encryption keys

Each migration plan file is generated with an encryption key unique to the application that created the plan. Encryption keys can be shared if the migration plan needs to be run through an application that did not originally generate the file. When sharing encryption keys, you will need to overwrite the existing key in the application to run the migration plan. To view your encryption key, select Help > Settings.

If you will be using the Content Migration Tool Console Runner for migration plans, you must specify the encryption key using the tabcmtrunner encryption command before running the plan. For more information, see Using the Tableau Content Migration Tool Console Runner.

Migration process

Step 1: Start

The core of the migration process is creating a plan, which you can save and re-use for future migrations or modify and update as needed. The first step is choosing whether to create a new plan, or select a previously saved plan.
To create a new plan, click **Create New Plan**. If you already created a migration plan and want to use it, click **Browse for a Plan**.

![Create New Plan and Browse for a Plan](image)

By default, all of your saved migration plans will be stored in the **Tableau Content Migration Tool Plans** folder in your **My Documents** folder. All migration plans are saved with a `.tcmx` extension, with recently accessed plans listed separately to make them easy to select:

![Recent Plans](image)

You can select a recently accessed plan and duplicate it to modify the plan and save it as a new plan. Select the plan you want to copy and click **Duplicate**.

![Duplicate](image)

**Step 2: Planning**

The Content Migration Tool guides you through building or editing your migration plan in six steps.

Click on each step for detailed instructions:

- Migration Plans: Sites
- Migration Plans: Source Projects
- Migration Plans: Workbooks
- Migration Plans: Published Data Sources
- Migration Plans: Permissions and Ownership
- Migration Plans: Migration Scripts
- Migration Plans: Plan Options
Step 3: Migration

Once you have completed your plan, you are now ready to run the batch process for migration. When you reach the final step of the migration, a plan summary displays for your verification:

If you want to change any aspects of your plan, you can click on a section in the left sidebar to go directly to that phase. When you are ready, click **Run** to begin your migration.

When you click **Run**, the migration tool will prompt you about any unsaved elements of your plan. By default, any unsaved elements will be saved when you click **Yes**. Remember you can always keep your previous plan without making any changes by duplicating it during the Start phase of the migration process.

Your migration plan will run and a status bar displays for the overall plan progress and each workbook being sent to the destination server.
When the plan finishes running, you can click the tabs at the bottom of the screen for more information about the migration.

Published workbooks

**Published Workbooks** details the newly published workbooks and the projects where they were migrated.

<table>
<thead>
<tr>
<th>Workbook</th>
<th>Project</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Data - 2019</td>
<td>Mkt-Q4</td>
<td>[View on Tableau Server]</td>
</tr>
</tbody>
</table>

Published data sources

**Published Data Sources** details the newly published data sources and the projects where they were migrated.

Output

The **Output** tab details the migration log of your plan.
You can save this log by clicking **Save Log**.

![Save Log](image)

Errors and warnings

The **Errors and Warnings** tab highlights any problems that occurred during the migration.

<table>
<thead>
<tr>
<th>Message</th>
<th>Workbook or Data Source</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination project [MixQ4] does not exist. To avoid this error, enable automatic destination project creation in Options or create the project manually.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migration failed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You can correct these and rerun your plan. When you have completed your migration and saved your plan, click **Done** to finish.
Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Limitations

There are certain limitations to migrations when using the Tableau Content Migration Tool. Before creating your migration plan, review the sections below to learn about version compatibility and content that will not be migrated.

Compatibility with Tableau content

The Content Migration Tool supports migrating workbooks and published data sources saved in the eight most recent versions of Tableau. Workbooks and published data sources saved before version 2018.1.x are not supported by CMT. For more information, see Getting Started with Tableau Content Migration Tool.

Configurations

The following configurations are not migrated to the destination site when using the Content Migration Tool.

- Users
- Groups
- Site settings (custom logos, view recommendations, etc.)

Data connections

While you can migrate existing data sources, only data sources that use the connection types in the table below can be changed and modified during migration. For more inform-
Tableau Online Help

The following content is not migrated to the destination site when using the Content Migration Tool and will require additional configuration.

<table>
<thead>
<tr>
<th>Data Source Type</th>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actian Matrix</td>
<td>Google Drive</td>
<td>Pivotal Greenplum Database</td>
</tr>
<tr>
<td>Actian Vectorwise</td>
<td>HortonWorks Hadoop Hive</td>
<td>PostgreSQL</td>
</tr>
<tr>
<td>Amazon Athena</td>
<td>HP Vertica</td>
<td>Progress OpenEdge</td>
</tr>
<tr>
<td>Amazon Aurora</td>
<td>IBM DB2</td>
<td>Salesforce</td>
</tr>
<tr>
<td>Amazon EMR</td>
<td>IBM Netezza</td>
<td>SAP HANA</td>
</tr>
<tr>
<td>Amazon Redshift</td>
<td>Map R Hadoop Hive</td>
<td>SAP Sybase ASE</td>
</tr>
<tr>
<td>Apache Drill</td>
<td>Microsoft Access</td>
<td>SAP Sybase IQ</td>
</tr>
<tr>
<td>Aster Database</td>
<td>Microsoft Analysis Services</td>
<td>Snowflake</td>
</tr>
<tr>
<td>Box</td>
<td>Microsoft Excel</td>
<td>Spark SQL</td>
</tr>
<tr>
<td>Cloudera Hadoop</td>
<td>Microsoft Excel Direct</td>
<td>Statistical File</td>
</tr>
<tr>
<td>Delimited Text File</td>
<td>Microsoft OneDrive</td>
<td>Tableau Extracts</td>
</tr>
<tr>
<td>EXASOL</td>
<td>Microsoft SQL Server</td>
<td>Tableau Server Data Sources</td>
</tr>
<tr>
<td>Firebird</td>
<td>MySQL</td>
<td>Teradata</td>
</tr>
<tr>
<td>Google Analytics</td>
<td>OData</td>
<td>Text File</td>
</tr>
<tr>
<td>Google BigQuery</td>
<td>Oracle</td>
<td>Web Data Connector</td>
</tr>
<tr>
<td>Google Cloud SQL</td>
<td>Oracle Essbase</td>
<td>Other Databases (ODBC)</td>
</tr>
<tr>
<td>Content</td>
<td>Action required</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Ask Data lenses</td>
<td>Users must recreate Ask Data lenses on the destination site. For more information, see Create Lenses that Focus Ask Data for Specific Audiences.</td>
<td></td>
</tr>
<tr>
<td>Collections</td>
<td>Users must recreate collections on the destination site. For more information, see Collections in Tableau Desktop help.</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Users must re-add comments to views on the destination site. For more information, see Comment on Views in Tableau Desktop help.</td>
<td></td>
</tr>
<tr>
<td>Custom views</td>
<td>Users must recreate custom views on the destination site. For more information, see Use Custom Views in Tableau Desktop help.</td>
<td></td>
</tr>
<tr>
<td>Data roles</td>
<td>Users must recreate data roles on the destination site. For more information see Use Data Roles to Validate your Data in Tableau Prep Builder help.</td>
<td></td>
</tr>
<tr>
<td>Data source certifications</td>
<td>If you have the following site roles and capabilities, you can certify data sources on the destination site.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Site Administrator Creator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Creator or Explorer (can publish) with Project Leader capability on the project containing the data source</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see Use Certification to Help Users Find Trusted Data.</td>
<td></td>
</tr>
<tr>
<td>Data-driven alerts</td>
<td>Users must recreate data-driven alerts for dashboards and views on the destination site. After data-driven alerts are created, anyone with access to the view can add themselves to existing alerts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see Send Data-Driven Alerts from Tableau Online or Tableau Server in Tableau Desktop help.</td>
<td></td>
</tr>
<tr>
<td>Descriptions</td>
<td>If you own the content item or have the appropriate permissions, you can</td>
<td></td>
</tr>
</tbody>
</table>
Tableau Online Help

for workbooks and data sources

- edit the item’s description on the destination site. For more information, see Add or edit descriptions in Tableau Desktop help.

Embedded credentials

- For security purposes, Tableau Server removes embedded credentials from data sources during the download process. To include embedded credentials when publishing to the destination site, use the Set Connection Info data source transformation. For more information, see Migration Plans: Published Data Sources.

External assets

- Customized attributes for external assets are not migrated to the destination site. For example, tags, certifications, data quality warnings, descriptions, permissions, user contacts, tables, and columns must be recreated. For more information, see Manage Permissions for External Assets.

Extract refresh schedules

- Extract refresh schedules cannot be migrated to Tableau Online destination sites. To refresh data on Tableau Online, you can run extract refreshes manually or create new extract refresh schedules. For more information, see Schedule Refreshes on Tableau Online.

Favorites

- Users must reselect their favorite content on the destination site. For more information, see Mark Favorites in Tableau Desktop help.

Flows

- To run flows on a schedule, users must republish flows to the destination site with Tableau Prep. For more information, see Publish a Flow to Tableau Server or Tableau Online in Tableau Prep help.

Incremental extract refreshes

- Incremental extract refreshes are changed to full extract refreshes on the destination site. Users must reconfigure incremental refreshes in Tableau Desktop and publish extracts to the destination site after migration. For more information, see Refresh Extracts in Tableau Desktop help.

Metrics

- The historical values for metrics are removed from views, and users must recreate metrics on the destination site. For more information, see Create and Troubleshoot Metrics.
Revision history
To migrate previous versions of workbooks to the destination site, users must download the versions they wish to keep and republish the workbook to the destination site. For more information see Work with Content Revisions in Tableau Desktop help.

Subscriptions
Users must resubscribe to views and workbooks on the destination site. For more information, see Create a Subscription to a View or Workbook.

Thumbnails for workbooks and views
Workbooks and views that are migrated using the Content Migration Tool will retain their original thumbnails, even if the migration plan includes transformations that result in the views being rendered differently (for example, if data connections change).

To update thumbnails, edit the workbook or view on the destination site and re-save it. For more information, see Edit Tableau Views on the Web in Tableau Desktop help.

Virtual connections
Users must recreate virtual connections on the destination site. For more information, see Create a Virtual Connection.

Migration Plans: Sites

The first step when creating a migration plan in the Tableau Content Migration Tool is to sign in to the source and destination sites.

In the Sites section of the planning phase, you’ll sign in to the source and destination sites. The permissions of the user credentials you use govern the sites and projects you see when creating a migration plan. You can only migrate content that the user has access to.
Required permissions and licenses

The user account(s) used to sign in to the source and destination sites must have an Explorer role or higher, and the following permissions for the content you want to migrate:

- View
- Download Workbook/Save a Copy
- Optional: Administrator (to select workbooks, to access a user list)

Both the source and destination sites must have a valid Advanced Management license. For more information, see About Tableau Advanced Management on Tableau Online.

Step 1: Source

Here is the starting point of the migration. Sign in to Tableau Online, then select your site to use as the source. Sites are independent silos of workbooks, data, and user lists created within Tableau to group related content for selected users. You can only migrate content from one site at a time.

Sign in to the source site

Use the steps below to sign in to Tableau Online or Tableau Server.

1. Click Sign in to Tableau.

2. In the Select a Connection dialog window, select a saved connection and click
Continue.

If no connections are available, click **Add or edit saved connections** to add a new connection. For more information, see **Saved connections**.

3. Enter your username and password, and click **Sign In**.

   If your server is configured for SAML or Single Sign-On, you are redirected to the Identity Provider sign-in page to complete the authentication process.

4. Select the site you want to use.

   To change the source server or update your site selection, click **Select a different source**.
Tableau Online Help

Step 2: Destination

Repeat the sign-in process for the destination site (the site you are migrating content to).

If you are migrating your workbooks between two projects on the same Tableau site, your sign-in credentials for the source and destination site will be identical (including the server URL and site name).

Saved connections

Using saved connections allow you to quickly sign in to the source and destination sites by creating a reusable connection. When adding a saved connection, you must specify the preferred sign-in method for your site.

The Content Migration Tool supports the following sign-in methods:

- **Personal access tokens**: Allows users to create long-lived authentication tokens for improved security, auditing, and automation of migration plans. Personal access tokens let users sign in without requiring interactive login in the Content Migration Tool. For more information, see Personal Access Tokens.

- **Browser-based sign-in**: Users enter their credentials and complete authentication through an embedded web browser. This option may be similar to how you usually authenticate to Tableau.

- **Username and password sign-in**: Users authenticate through the Content Migration Tool instead of an embedded browser window. This option passes credentials to the server using Tableau REST APIs. You can use username and password sign-in to troubleshoot issues that prevent the use of browser-based sign-in.

Add or edit saved connections

A link to **Add or edit saved connections** is displayed at the bottom of the Content Migration Tool, and when signing in to the source and destination sites. Clicking this link will open the **Manage Tableau Connections** window.
Use the steps below to add a saved connection:

1. On the Manage Tableau Connections window, click New Connection, or select an existing connection to make changes.

2. Enter a Connection Name (name to describe your server) and the Server URL.
   
   If you don't include a prefix for the Server URL, the Content Migration Tool will use http://.

3. Select the sign-in method for your connection.
   
   If you're using personal access tokens, see Add saved connections with personal access tokens.

4. Click Save.
After you create a saved connection, it's listed in the Select a Connection window next time you sign in to the source and destination sites.

Add saved connections with personal access tokens

Adding a saved connection with a personal access token requires more information than other sign-in methods. You will need to create a new personal access token on the source and destination sites to begin. Personal access tokens should not be shared between applications. For more information, see Personal Access Tokens.

Creating personal access tokens

1. In a web browser, sign in to your Tableau site.

2. At the top of the page, click your profile image or initials, and then select My Account Settings.

3. Under Personal Access Tokens, enter a descriptive name for your token in the Token Name field, and then click Create new token.

4. In the resulting window, click Copy to clipboard and then close the window.

5. Paste the token secret to a file. Store the file in a safe location.

Adding personal access tokens

1. In the Content Migration Tool, click Add or edit saved connections.

2. On the Manage Tableau Connections window, enter a Connection name and the Server URL.
To connect to Tableau Online, you must enter the full pod URL of your site. For example, https://10ay.online.tableau.com. Your pod is shown in the first portion of the site URL after signing in to Tableau Online.

3. Enter the Personal access token name and Personal access token secret, obtained when creating a personal access token in the previous section.

4. In the Site name field, enter the site name as it appears in the URL, without spaces. This is different than the friendly site name. For example, “Site A” would be “sitea” in a browser URL.

5. Click Save.

Step 3: Continue to the next step

After successfully signing in to both source and destination sites, click Next to continue to the Migration Plans: Source Projects section of the planning phase.

Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Plans: Source Projects

The next step in creating a migration plan in the Tableau Content Migration Tool is to select the source projects. Source projects are the projects the workbooks and published data sources will be migrated from. The projects you choose determine which workbooks are available to migrate in the next step of the migration plan.

Step 1: Select your source project

There are two options when selecting source projects, All Projects, and Specific Projects:
The **All Projects** option selects all projects from the source site you specified in the Servers step. The **Specific Projects** option allows you to select specific projects from the source site.

**Note:** Source projects must contain workbooks or data sources. Content Migration Tool will not migrate empty projects.

You can select each project individually or use the **Select All** button and then clear selections for the projects you don't want to include. If you make any changes on the source site while on this step, you can use the **Refresh** button to update the projects list.

**Step 2: Select project options**

Once the source projects are selected, select which project options to apply for the destination location. There are options to create projects that don't exist, in addition to copying...
project permissions and ownership from the source location. To assign new content ownership based on user mappings, select **Apply User Mappings**.

**Project Options**

- **Create Destination Projects**: Automatically create projects that don’t exist in the destination location. Content Migration Tool will not create destination projects if the source project is empty or no workbooks or data sources are selected. By default, attempts to migrate to a non-existent project will result in a failed migration.

- **Copy Project Permissions**: Copy source project permissions as closely as possible.

- **Copy Project Owner**: Copy project ownership settings from the source location to assign the project owner.

- **Apply User Mappings**: Apply user mappings to assign content ownership of projects in the destination location. Content ownership won’t be applied if the destination project already exists. For more information, see Migration Plans: Permissions and Ownership.

Step 3: Continue to the next step

After selecting the source projects, click **Next** to continue to the Migration Plans: Workbooks section of the planning phase. If you are migrating workbooks between two projects on the same Tableau site, you’ll choose your destination project in the next section.
Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions for workbooks on the source site and Publishing rights (View and Publish capabilities) for target projects on the destination site. For more information, see Permissions.

Migration Plans: Workbooks

You have successfully signed in to your source and destination sites and selected projects. The next step is to prepare your workbooks for migration.

**Note:** If your workbooks or data sources include extracts, be sure you read and understand the information in Migrating Workbooks and Data Sources that use Extracts.

Step 1: Workbook selection

All of the workbooks in the source site and selected projects appear on the Workbook Selection screen.
If you make any changes to the workbooks in the source site while on this step, you can click **Refresh** to update the workbook listings. There are several different ways to select these workbooks.

**Specific Workbooks Selection**

There are three buttons in the **Specific** section. Any choices from the Basic section will immediately include the specifically selected workbook in the migration plan. Alternate, you can individually select specific workbooks by clicking on each one.
Select All

This button will select or clear selection of all the workbooks in the site. If additional workbooks are added to the site after the plan is saved, they will not be automatically added the next time the plan is used.

Display:

Thumbnails

The default view shows your workbooks in thumbnail previews to help you differentiate each of them. In this view, mousing over the thumbnail will show previews of the other worksheets and dashboards within that workbook.

List

The list view is a more succinct listing that also provides additional information, including Workbook Name, Project, Tableau Version, and Last Modified.

Clicking on any of the column headers will sort the workbooks appropriately. Also, mousing over any of the workbooks will also provide a floating preview of the worksheets and dashboards within that workbook. List view is particularly useful if you have a large amount of workbooks in a site.

Rule Based Selection

You can use Rule Based selection to choose workbooks based on specific criteria. Rule-based options will create workbook selection criteria to be used when the migration plan is run. Be aware that selecting "all" in any of the Rule Based options is different than the Specific Workbooks selection. A rule-based "all" selection will always include all workbooks, so any newly added workbooks are included in future migrations.
The Rule Based radio button allows you to select workbooks by using the following options:

**Workbooks in projects**

This menu allows you to select workbooks from specific projects.

**Workbooks tagged with**

This menu allows you to select workbooks by their tags.

**Workbooks published by**

This menu allows you to select workbooks by their author.

With each option, you can select individually or multiple by clicking on the option next to each entry. All selected workbooks will appear in the Selection Description box.

**All Workbooks Selection**

The last option is to select the All Workbooks radio button, which selects all workbooks in all projects in the site.

Using the All Workbooks radio button is different than selecting all of the workbooks using the Specific Workbook method because it will use every workbook in the source site each time the migration plan is used in the future.
When you are satisfied with your workbook selections, click Next.

Step 2: Workbook mapping

You can now map your selected workbooks from the source file to the destination file. Mapping allows you to rename source workbooks as they are migrated and choose different destinations. You can also add mapping to change the project, prefix, or suffix for the workbooks as well. Projects can be added to the Destination in this section as well.

If you make no changes here, then the selected workbooks will simply be migrated with the same name and into the same project as the source. If you have not defined projects in your destination site, then they will be migrated into the Default project. To add workbook mapping click the Add Mapping button. The following options will appear in the mapping area.

- **Rename Workbook**
  Change the destination name or project of a single workbook.

- **Change Project**
  Change the destination project for all workbooks from a source project.

- **Change Prefix**
  Remove or replace the prefix for workbooks from one or all source projects.

- **Change Suffix**
  Remove or replace the suffix for workbooks from one or all source projects.
Rename Workbook

This transformation allows you to filter by the **Source** project and select the desired workbook(s) to rename. In the **Destination** field, select which project you would like the workbook to be directed to and enter the desired name.

Change Project

By default, the workbooks are migrated to the same project in the destination. This mapping allows you to change the destination project for all workbooks from a source project.

Add Project

When renaming the workbook or changing the project, the **Add New** option allows you to create a destination project without having to sign in to the destination site and create the project manually. You can create both projects and nested projects using the **Add New** dialog box.
This allows you to remove or replace the prefix for workbooks from one or all source projects.
Change Suffix

Like the prefix mapping, you can remove or replace the suffix for workbooks from one or all source projects.

Step 3: Workbook transformations

You can change and modify your workbooks by using the Transformation step.

Transformations modify your workbooks in a specified manner. Additional transformations can be included via plug-ins or will be added in future versions of the application. Click on the Add Transformation drop-down menu to see the selection of Transformations currently available.

**Workbook Transformations**

- **Replace Action URL**
  Replaces all or part of an action URL.

- **Set Parameter Value**
  Sets the current value of a parameter.

- **Remove Image**
  Removes an image by file name.

- **Remove Tooltip Commands**
  Removes command buttons from all tooltips.

- **Replace Image**
  Replaces all or part of an image file name.

- **Replace Text**
  Replaces text in the workbook.

- **Set Zoom Control Visibility**
  Sets the visibility mode of all zoom controls.

- **Web Page URL Replacement**
  Replaces all or part of a web page URL used on dashboards.
Selecting any of the transformations will bring up the Edit Transformation window, which will allow you to customize it to your selected workbooks. All transformations will be completed in the order that they are listed from top to bottom.

For all of the different types of transformations, there are two basic steps. The first step is to make your selection for the transformation. In this case, select the workbook(s) you want to transform. The selection area is similar to the Workbook Selection section of the Planning phase with all of the features of the Basic selection radio button: Select/Unselect All, Refresh, Thumbnail Display, and List Display. At the top of the list, you can select Select All workbooks, which is an option to automatically select all workbooks for future transformations. You can also Refresh the workbook display window to reflect any changes or updates to the source site.

The second step is to use the options tab to enter the specific selections for whichever transformation you select.
Each of the workbook transformations have different values to be entered on the options tab, and the tab will have different names, depending on the transformation you're editing:

**Action URL Replacement**

Replace part or all of an URL action inside of the workbook using this transformation. On the options tab, enter the text that should be matched and its replacement value.

**Example:**

**URL:** www.exampledev.com

**Match:** dev
Set Parameter Value

Define a new parameter. On the options tab, enter the name of the Parameter, the data type from the drop-down menu, and the value.

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Data Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Float</td>
<td></td>
</tr>
</tbody>
</table>

Remove Images

Remove any images (such as a watermark) in the selected workbooks by entering in the file name on the options tab. There is an additional check box to receive a warning during migration if no image is found.

<table>
<thead>
<tr>
<th>File Name</th>
</tr>
</thead>
</table>

Remove Tooltip Commands

Remove all of the tooltip commands from the selected workbooks. There are no additional options to define for this transformation.

Replace Images

Replace any images in the selected workbooks. On the options tab, enter the file name of the old image and file name of the replacement image. You can use a local file path or URL to replace images.
Example:

File Name: C:\file\image.png

Replacement Image URL: http://www.exampledev.com/replacementImage.png

Zoom Control Visibility

Set the visibility mode from the drop-down menu: Automatic, Show on Hover, or Hide on the options tab.

Visibility Mode: Automatic

Web Page URL Replacement

Replace part or all of a web page URL used on dashboards using this transformation. On the options tab, enter the text that should be matched and its replacement value.

Match

Replacement

Example:

URL: www.exampledev.com

Match: dev

Replacement: Prod
Step 4: Data source transformations

The next step in planning your workbooks for your enterprise migration are your data source transformations. It is similar in function to the Workbook Transformations step. These are for data sources that are packaged within the workbooks. Published data sources are handled in a different step in the process.

Click on the **Add Transformation** drop-down menu and the following options will appear:

**Data Source Transformations**

- **Replace Table/Schema Name**
  Replaces all or part of a table or schema name.

- **Set Calculation Formula**
  Overwrites the formula for a calculated field.

- **Set Data Source Display Name**
  Change the display name on a data source.

- **Set Connection Info**
  Modifies connection information or changes published data sources for a workbook.

- **Set Custom SQL**
  Modifies the custom SQL for matching data sources.

- **Remove Extract**
  Removes extracts from matching data sources.

- **Apply Saved Credentials**
  Applies saved credentials for a data connection.

Selecting any of the data source transformations will bring up the Edit Transformation window, which will allow you to customize it to your selected data sources. All transformations will be completed in the order that they are listed from top to bottom.
For all of the different types of data source transformations, there are two basic steps. The first step is to enter in the match criteria for the desired data source. Depending on which connection type you select, more fields will appear on the **Match Criteria** tab.

Click on the **Preview Source Connections** to find any connections that match the criteria entered.
The second step is to use the options tab to enter the specific selections for whichever transformation you select.
Each of the data source transformations have different values to be entered on the options tab:

Set Calculation Formula

On the options tab, you can replace the calculation for a column.
Set Connection Info

On the New Connection Values tab, enter the authentication method and connection details for the new data source. Depending on which connection type you select, more fields will appear.

Select the **Tableau Server (Published Data Source)** connection type to change the published data source for a workbook. This can reduce the manual steps required when migrating workbooks between projects, for example, promoting content from development to production.

To change the published data source, select a data source from the drop-down menu and enter the **Tableau Username** for authentication. The user must exist on the destination site and have the Connect capability for the published data source.

- For file-based data sources, users will access the workbook and see data based on permissions of the specified Tableau user.
- For all other data sources, users are prompted for their own database credentials when the view or workbook loads.

If Tableau Username isn't specified, only users with the Connect capability can see data in the workbook.

<table>
<thead>
<tr>
<th>Published Data Source</th>
<th>(No Change)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableau Username</td>
<td></td>
</tr>
</tbody>
</table>

Set Custom SQL

On the New Custom SQL tab, enter the name of the custom SQL query you want to modify for **Match Query Name**. The query name must match the custom SQL query name from the physical layer of the data source. If these names don't match, the transformation will fail. For more information about data modeling and the physical layer, see The Tableau Data Model.
After entering the query name, enter the desired **Custom SQL** in the text field. Be aware that custom SQL can negatively impact the performance of your workbooks if improperly used.

![Match Query Name and Custom SQL](image)

**Remove Extract**

There is no options tab for this transformation, simply enter in the **Match Criteria** information and the extract will be removed during migration.

In addition, on each of the transformations you can enter notes in the **Comments** section on the left-hand side of the **Edit Transformation** window.

**Apply Saved Credentials**

On the options tab, enter the **Tableau Username** and corresponding **Saved Credentials Username** for the data connection. You can only apply saved credentials for existing data connections on the Account Settings page of your Tableau site. For more information, see Manage Saved Credentials for Data Connections.

![Tableau Username and Saved Credentials Username](image)

**Step 5: Publish options**

The final step in the Workbooks phase is to select publish options and create transformations for tags, extract refresh schedules, and permissions.
Workbook Publish Options

- **Reset Dashboard Selections**: This option deselects all objects on dashboards.
- **Overwrite Newer Workbooks**: If checked, a workbook will be migrated even if it will overwrite a workbook that has been created at the same time or more recently than the moved workbook.
- **Copy Workbook Permissions**: When selected, the migration tool will attempt to match source workbook permissions as closely as possible.
- **Copy Extract Refresh Schedules**: When selected, the migration tool will attempt to set the destination workbook extract refresh schedule(s) to schedules matching the source’s name.

Content Owner Settings

- **Copy Workbook Owner**
- **Apply User Mappings**

No additional publish options.
**Note:** Extract refresh schedules cannot be created in Tableau Online. This option is not available if the destination is a Tableau Online site. For more information, see Migration Limitations.

**Copy Workbook Owner**

Copy workbook owner settings from the source location to assign the workbook owner. If unselected, the Content Migration Tool user is given ownership of the workbook in the destination location.

**Apply User Mappings**

Apply user mappings to assign content ownership. Select this option if there are differences in username syntax in the destination location. For more information, see Migration Plans: Permissions and Ownership.

**Add Option**

Click on the **Add Option** drop-down menu for the different types of transformations you can add:

1. **Add Tags**
   Adds one or more tags to workbooks.
2. **Remove Tags**
   Removes one or more tags from workbooks.
3. **Apply Extract Refresh Schedules**
   Applies destination extract refresh schedules to migrated workbooks.
4. **Set Permissions**
   Sets the workbook-level permissions to be used during migration.
5. **Set Generate Thumbnail As**
   Sets the user or group to be used for generating user-specific data in the workbook thumbnail.

For all of the different types of transformations, there are two basic steps. The first step is to make your selection for the transformation. In this case, select the workbook(s) you want to
transform. The selection area is similar to the Workbook Selection section of the Planning phase with all of the features of the Basic selection radio button: Select/Unselect All, Refresh, Thumbnail Display, and List Display. At the top of the list, you can select Select All workbooks, which is an option to automatically select all workbooks for future transformations. You can also Refresh the workbook display window to reflect any changes or updates to the source site.

The second step is to use the options tab to enter the specific selections for whichever transformation you select. Note: The options tab will have different names, depending on which transformation you are editing.

Add Tags

This allows you to add one or more tags to the workbook. If you hover your mouse over a previously entered tag, a blue “X” will appear to allow deletion.
Remove Tags

This allows you to add one or more tags to the workbook. If you hover your mouse over a previously entered tag, a blue “X” will appear to allow deletion. You can also choose to remove the tag from the source or destination workbooks.
Apply Extract Refresh Schedules

Here you can apply destination extract refresh schedules to migrated workbooks. The list of schedules generated are from the destination.

**Note:** Extract refresh schedules cannot be created in Tableau Online. This option is not available if the destination is a Tableau Online site. For more information, see Migration Limitations.
Set Permissions

This transformation is to edit the permissions for the selected workbooks. Enter in a Group or User and then click Add. Adjust the permissions as desired. The four different options are to Allow the permission, Deny the permission, Inherit, or to keep the Source Value.
Set Generate Thumbnail As

This allows you to set the User or Group to be used for generating user-specific data in the workbook thumbnail after being migrated. Each option has a drop down to select the desired user or group.
Step 6: Continue to the next step

After selecting your workbooks and preferences, click **Next** to continue to the Migration Plans: Published Data Sources section of the planning phase.

Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Plans: Published Data Sources

The next step of creating a migration plan in the Tableau Content Migration Tool is to select, map, and add any transformations to your published data sources. The process is very similar to the Workbooks step of the planning phase, particularly the data source mapping step.
Step 1: Selection

Starting the Published Data Sources phase of the migration plan, you’ll select any data sources you want to include in the migration plan:

The data sources will only be selected at the moment of migration. You have two methods of selection. Use **Specific Data Sources** to choose one or more published data sources. Click **Refresh** to reload the list of published data sources available.

The second option is **All Data Sources**, which selects every data source in the source site.

Step 2: Mapping

The next step is to map your source data sources to the new destination. This is similar in functionality to mapping workbooks.

If you make no changes here, then the selected data sources will simply be deployed with
the same name and project as the source. To add data source mapping click **Add Mapping**. The following options will appear in the mapping area.

<table>
<thead>
<tr>
<th>Name</th>
<th>Project</th>
<th>Destination Name</th>
<th>Destination Project</th>
</tr>
</thead>
</table>
| **Delete** | (All Selected Data Sources) | (Same As Source) | |}

The entry has the following options:

**Delete**

Clicking the **Delete** link will delete this mapping entry.

**Name**

Use the **Name** menu to select the data source you wish to map. You can select **(All Selected Data Sources)** to choose all of the data sources.

**Project**

The **Project** is the project of the associated data source names.

**Destination Name**

By default, the Content Migration Tool will use the same **Destination Name(Same As Source)**, keeping the original name in the Source file, but you can type in a new name here for the destination folder.

**Destination Project**

If your destination projects have already been created on your site, you can choose which project to place your migrated workbooks or click **Add New** to create a new project. You can create different project destinations for individual data sources.
In most situations if multiple mapping entries exist for a single data source, a validation error will be displayed and must be fixed to continue. There is one important exception to this – a data source may match both a specific selection and a project-wide mapping entry. In this instance, the more specific entry will be used.

When you have completed all of the data source mapping necessary, click **Next** to continue.

Step 3: Data source transformations

You can modify your data sources by using the transformation option. Click **Add Transformation** to see the list of transformations available.
Selecting any of the data source transformations opens the **Edit Transformation** window. Use this to customize your selected data sources. Transformations are executed in the order they are listed, from top to bottom.

For most data source transformations, there are two basic steps. The first step is to enter in the **Match Criteria** for the desired data source. Depending on which connection type you select, more fields will appear on the **Match Criteria** tab.
The second step depends on which transformation type you are adding. Each of the data source transformations have different values to be entered on the second tab.

You can add notes in the Comments section on the left side of the Edit Transformation window for each of the transformations you add.

Replace Table/Schema Name

On the Options tab, you can replace all or part of a table or schema name.

Set Calculation Formula

On the New Calculation Formula tab, you can replace the calculation for a column.
Set Connection Info

On the New Connection Values tab, there will be different fields here based on the Connection Type you selected and perhaps even no fields needed at all.

Set Custom SQL

On the New Custom SQL tab, enter in any custom SQL in the text area desired. You should be aware that custom SQL can negatively impact the performance of your workbooks if improperly used.

Remove Extract

There is no Options tab for this transformation. Type the Match Criteria information and the extract will be removed during migration.

Use Tableau Bridge

There is no Options tab for this transformation. Type the Match Criteria information and data sources that are within a private network (inaccessible to the public internet) will be allowed to refresh using Tableau Bridge.
The destination Tableau Online site must have Tableau Bridge configured before migrating data sources. For information about Tableau Bridge, see Use Tableau Bridge in Tableau Online help. After the migration, data sources will need to be assigned a refresh schedule through Tableau Online.

**Apply Saved Credentials**

On the options tab, enter the **Tableau Username** and corresponding **Saved Credentials Username** for the data connection. You can only apply saved credentials for existing data connections on the Account Settings page of your Tableau site. For more information, see Manage Saved Credentials for Data Connections.

Tableau Username

Saved Credentials Username

**Step 4: Publish options**

The final step in the Published Data Source phase is to create transformations for permissions and tags and finalize the publish options specific to the data sources.

**Data Source Publish Options**

- Overwrite Newer Data Sources
- Copy Data Source Permissions
- Copy Extract Refresh Schedules
- Copy Data Source Owner
- Apply User Mappings

Add Option

No additional publish options.
Overwrite Newer Data Sources

If selected, a data source will be published even if it will overwrite a data source that has been updated more recently.

Copy Data Source Permissions

When selected, the migration tool will attempt to match source published data source permissions as closely as possible.

Copy Extract Refresh Schedules

When selected, the migration tool will attempt to set the destination data source extract refresh schedule to schedules matching the source’s name.

Note: Extract refresh schedules cannot be created in Tableau Online. This option is not available if the destination is a Tableau Online site. For more information, see Migration Limitations.

Copy Data Source Owner

Copy data source owner settings from the source location to assign the data source owner. If unselected, the Content Migration Tool user is given ownership of the data source in the destination location.

Apply User Mappings

Apply user mappings to assign content ownership. Select this option if there are differences in username syntax in the destination location. For more information, see Migration Plans: Permissions and Ownership.

Add Options

Click on the Add Option drop-down menu for the different types of transformations you can add:
For all of the different types of transformations, there are two basic steps. The first step is to make your selection for the transformation. In this case, select the data source(s) you want to transform. At the top of the list, you can select \textit{Apply to all published data sources}, which is an option to automatically select all data sources for future transformations. You can also \textit{Refresh} the data source display window to reflect any changes or updates to the source site.

The second step is to enter the specific selections for the transformation you select.
Remove Tags

Once the data sources you would like to remove tags from are selected, enter any tags you want to remove by entering them into the field at the bottom and click **Add**. From this screen, you can also select to remove from the source or destination data sources. If you want to remove a previously entered tag, click on it and press the delete key.

Add Tags

After selecting the data sources desired, enter any tags you want to assign by entering them into the field at the bottom and click **Add**. If you want to remove a tag, click on it and press the delete key.
In addition, on each of the transformations you can enter notes in the **Comments** section on the left-hand side of the Edit Transformation window.

**Apply Extract Refresh Schedules**

This transformation applies destination extract refresh schedules to migrated data sources. The list of schedules generated are from the destination.

**Note:** Extract refresh schedules cannot be created in Tableau Online. This option is not available if the destination is a Tableau Online site. For more information, see Migration Limitations.
Set Permissions

The last type of transformation is to edit the permissions for the selected data sources. Enter in a Group or User and click **Add**. Adjust the permissions as desired. The four different options are to **Allow** the permission, **Deny** the permission, **Inherit**, or to keep the **Source Value**.
Step 5: Continue to the next step

When you are ready, click Next to continue to the Migration Plans: Permissions and Ownership section of the planning phase.

Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Plans: Permissions and Ownership

The Content Migration Tool allows you to replicate workbook and data source permissions to different users. You can create user permissions mappings to customize and secure content after it has been published to the destination location. Mappings are applied if Copy Project Permissions, Copy Workbook Permissions, or Copy Data Source Permissions have been selected earlier in the planning phase, along with Apply User Mappings.
For more information, see Migration Plans: Source Projects, Migration Plans: Workbooks, and Migration Plans: Published Data Sources.

Mapping limitations

- Content Migration Tool will stop the migration process if it fails to find the mapped user or group in the destination location. Subsequent user or group permissions mappings are not checked after the first failure, and the plan must be run again.

- Content Migration Tool cannot replicate permissions if the source content has permissions for multiple users and groups with identical names. This only occurs when there are duplicate user or group names sourced from separate domains.

Step 1: Add mapping

To add user permissions mapping, click **Add Mapping** and select whether to change the name of a domain, user, group or to import mappings from a comma-separated values (CSV) file. If Content Migration Tool is unable to match a permission in the destination location, the source content will not be migrated.

![User Mapping](image)

**Domain Mapping**

Change the destination name of a single domain

**User Mapping**

Change the destination name of a user

**Group Mapping**

Change the destination name of a group

**Import from File**

Upload a .csv file containing domain, user, and group mappings

Domain Mapping

Domain permissions mapping applies to all users and groups in the destination location. If you are unsure about the source or destination domain, you can check the user and group
pages on your Tableau site. If local user provisioning has been selected, the domain must be specified as local.

User Mapping

User permissions mapping automatically populates a list of users from the source and destination locations using the syntax `domain\user`. You cannot enter and save the names of users that don’t exist.

**Note:** When migrating between projects on the same site, the destination location and list of users will be the same. You can use mappings to update content ownership from `User_A` to `User_B` on the site.

Group Mapping

Group permissions mapping automatically populates a list of users from the source and destination locations using the syntax `domain\group`. You cannot enter and save the names of groups that don’t exist.
Import mappings from a CSV file

Starting in version 2021.4, you can import a CSV file containing domain, user, and group mappings to quickly prepare your data for migration. Importing mappings can reduce the manual steps required to run a migration plan by allowing you to create and edit your mappings in bulk outside of Content Migration Tool. To import mappings, select **Import from File** from the Add Mapping menu.

CSV file format requirements

When you create a CSV file to import mappings, make sure that the file meets the following requirements:

- The file does not include column headings. Tableau assumes that every line represents a mapping.

- The file contains three comma-separated values per row: mapping type, source domain/user/group, and destination domain/user/group.

- Include the domain for user names and groups if the server uses Active Directory authentication or "local" if a local identity store is used.

You must specify "domain," "user," or "group" for mapping type, as shown in the following table. The source and destination columns provide example syntax for Active Directory and a local identity store. Actual values in the CSV file will vary depending on your organization.
Import user permissions mappings

To import user permissions mappings in the Content Migration Tool:

1. Click **Add Mapping** and select **Import from File**.

2. In the dialogue window, click **Export CSV** to export a .csv file containing all users and groups from the source site. Edit the resulting file in a text editor to add mappings for the destination site.

   If you already have a mapping file, skip to step 3.

   **Note:** The exported CSV file doesn’t include domains from the source site. Domains must be added manually to the CSV to create domain mappings.

3. Click **Import Mappings** and select the mapping file you want to import.

Content Migration Tool will validate the mappings for errors when importing the file. If errors are detected, you must fix each error in the CSV file and then import it again.

**CSV import example**

The following example shows a CSV file that contains multiple mapping types.

```
user,local\hwilson,companyx.lan\henry.wilson
user,local\jjohnson,companyx.lan\janna.johnson
user,local\mkim,companyx.lan\michele.kim
user,local\fsuzuki,companyx.lan\fred.suzuki
```
user,local\awang,companyx.lan\alan.wang
user,local\snguyen,companyx.lan\susan.nguyen
user,local\lrodriguez,companyx.lan\laura.rodriguez
user,local\agarcia,companyx.lan\ashley.garcia
group,local\All Users,companyx.lan\All Users
group,local\Finance Team,companyx.lan\Finance Group
domain,dev.mycompany,prod.mycompany

A preview window is displayed while importing the CSV that shows mappings removed, added or updated, unchanged, and ignored. Review that the mapping changes are correct and click Accept.
### Tableau Online Help

#### Import from File

Review the table to make sure mapping changes are correct before continuing.

**Removed: 5**

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_5&quot; to &quot;local\Company_User_5&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_6&quot; to &quot;local\Company_User_6&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_7&quot; to &quot;local\Company_User_7&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_8&quot; to &quot;local\Company_User_8&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_9&quot; to &quot;local\Company_User_9&quot;</td>
</tr>
</tbody>
</table>

**Added or updated: 9**

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_15&quot; to &quot;local\Company_User_15&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_16&quot; to &quot;local\Company_User_16&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_20&quot; to &quot;local\Company_User_20&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_23&quot; to &quot;local\Company_User_23&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_3&quot; to &quot;local\Company_User_3&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_20&quot; to &quot;local\Company_User_20&quot;</td>
</tr>
</tbody>
</table>

**Unchanged: 18**

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_1&quot; to &quot;local\Company_User_1&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_10&quot; to &quot;local\Company_User_10&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_11&quot; to &quot;local\Company_User_11&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_12&quot; to &quot;local\Company_User_12&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_13&quot; to &quot;local\Company_User_13&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_14&quot; to &quot;local\Company_User_14&quot;</td>
</tr>
</tbody>
</table>

**Ignored: 6**

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\Service_User_1&quot; to &quot;local\Company_Service_User_1&quot;</td>
</tr>
<tr>
<td>Group Mapping</td>
<td>Match &quot;sales_group&quot; to &quot;sales_west_group&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_40&quot; to &quot;local\Company_User_40&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_41&quot; to &quot;local\Company_User_41&quot;</td>
</tr>
<tr>
<td>User Mapping</td>
<td>Match &quot;local\User_42&quot; to &quot;local\Company_User_42&quot;</td>
</tr>
</tbody>
</table>
Once the mappings are imported successfully, you can edit, delete, or change the mapping order as described in Step 2.

Step 2: Change mapping order

After a permissions mapping is created, you can change the order using the **Up** or **Down** options to determine when it will be handled during the migration. When a domain, user, or group is handled in a permissions mapping, any subsequent permissions mappings for the source domain, user, or group will be ignored.

In the example below, permissions for **User_A** are mapped to **User_B**. Content Migration Tool will ignore the second permissions mapping because **User_A** has already been handled.

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit   Delete   Up   Down</td>
<td>User Mapping</td>
</tr>
<tr>
<td></td>
<td>Match &quot;local\User_A&quot; to &quot;local\User_B&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit   Delete   Up   Down</td>
<td>User Mapping</td>
</tr>
<tr>
<td></td>
<td>Match &quot;local\User_A&quot; to &quot;local\User_C&quot;</td>
</tr>
</tbody>
</table>

In the example below, the first permissions mapping associates the domain for all users to **prod**. Content Migration Tool will ignore the second permissions mapping because the domain for **User_A** has already been handled.

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit   Delete   Up   Down</td>
<td>Domain Mapping</td>
</tr>
<tr>
<td></td>
<td>Match &quot;local&quot; to &quot;prod&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit   Delete   Up   Down</td>
<td>User Mapping</td>
</tr>
<tr>
<td></td>
<td>Match &quot;User_A&quot; to &quot;dev\User_B&quot;</td>
</tr>
</tbody>
</table>

Step 3: Continue to next step

When you are ready, click **Next** to continue to the Migration Plans: Migration Scripts section of the planning phase.
Tableau Online Help

Who can do this

Tableau site user with a Site Administrator Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Plans: Migration Scripts

The next step of creating a migration plan in the Tableau Content Migration Tool is to create any scripts you want to run with your plan before or after migration.

Step 1: Pre-Migration

The **Run Pre Migration** section of the screen is dedicated to scripts that will run before the migration.

![Run Pre Migration section](image)

Each field has a help icon you can get information from by moving your cursor over it. To start with your pre-migration scripts, select **Enable**, which will then activate the fields below.

**Working Directory**

This is the working directory for the script. The default directory is the same folder as the migration plan. Click on the browse button to select a different folder. The **Reset** button will restore the current folder as the plan as the working directory.
Run

This drop down allows you to choose either to run a custom script or an executable with parameters.

Command Executable

If you selected **Executable with Parameters** from the Run menu, this field will appear. This is the file path to the command executable to run before migration. Type it in directly or use the browse button to find the executable. This is a required field.

Command Parameters

If you selected **Executable with Parameters** from the Run drop-down menu, this field will appear. Enter in command line parameters here to use with the command executable.

Script

If you selected **Custom script** from the Run menu, enter in your pre-migration script here. It will be executed as a *.cmd file. This is a required field.

Step 2: Post-Migration

The **Run Post Migration** half of the screen is dedicated to scripts that will run after migration.
Each field has a help icon you can get information from by moving your cursor over it. To start with your post-migration scripts, select Enable, which will then activate the fields below.

**Working Directory**

This is the working directory for the script. The default directory is the same folder as the migration plan. Click on the browse button to select a different folder. The Reset button will restore the current folder as the plan as the working directory.

**Run**

This drop down allows you to choose either to run a custom script or an executable with parameters.

**Command Executable**

If you selected Executable with Parameters from the Run menu, this field will appear. This is the file path to the command executable to run before migration. Type it in directly or use the browse button to find the executable. This is a required field.

**Command Parameters**

If you selected Executable with Parameters from the Run menu, this field displays. Enter in command line parameters here to use with the command executable.

**Script**

If you selected Custom script from the Run menu, enter in your post-migration script here. It will be executed as a *.cmd file. This is a required field.

Step 3: Continue to Next Step

When you are ready, click Next.
Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migration Plans: Plan Options

The last step of creating a migration plan in the Tableau Content Migration Tool is configuring the **Options** section.

![Plan Options](image1)

Each option on this screen has a question mark that will provide contextual assistance for that particular option.

Step 1: Options

There are five options.

![Plan Options](image2)
The Plan Name is the name of the plan as it will appear in Content Migration Tool. We recommend using a user-friendly name for your plan name.

The following checkboxes offer the following additional options:

- **Refresh Extracts After Migration**: If selected, any data extracts will be refreshed immediately after migration if Content Migration Tool detects that they might have been modified during migration. Click the Filter link for more options.

- **Automatically create Extract Refresh Schedules that do not Exist**: Automatically creates destination extract schedules that do not exist. If not checked, source schedules that do not exist on the destination site will not be copied.

- **Continue Migration if Workbook or Data Source Fails**: If checked, errors migrating a workbook or data source will not cause the migration to stop. The errors will be logged and the migration will continue. Errors during version control will always stop the migration.

- **Continue Migration if Permission or Ownership Mapping Fails**: If checked, errors copying permissions or ownership will not cause the migration to stop. The errors will be logged and the migration will continue.

Exclude Extract Refreshes

By clicking on the Filter link after the Refresh Extracts After Migration option, you will be able to choose which workbooks or published data sources will be excluded from being refreshed.
Use the back and forth arrow buttons to select which items you want excluded and then click **OK**.

**Step 2: Version Control**

These options allow you to avoid losing the existing workbooks in the destination site that might be replaced by the migrated workbooks.
Click **Enable** to save your previous versions. You can choose to archive workbooks and/or published data sources. You’ll need to select an option from the **Archive To** menu which lists all of the projects in your site. We recommend creating a special archive project just to store your versioned workbooks.

There is a refresh button at the end of the **Archive To** box to update any projects that have been added to the site.

Step 3: Save Plan

Once you have completed all of your selections on the **Plan Options** screen, you can save your plan for future use. Click **Save Plan**.

Your plan will be saved to Tableau Content Migration Tool folder in the My Documents folder on your local machine.

Step 4: Continue to Next Step

When you are ready, click on **Verify & Run** to end the Planning phase of your migration and prepare to run your plan.
Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Migrating Workbooks and Data Sources that use Extracts

Tableau Online users can publish extracts which are copies, or subsets of the original data. These extracts may be embedded in a workbook or a data source. By default, when you use the Tableau Content Migration Tool to migrate a workbook or data source that contains an extract, that extract is migrated along with the workbook or data source that contains it. The Content Migration Tool gives you a couple options for controlling this behavior:

- **Switching to a Live Connection**

  You can add the Remove Extract transformation to your migration plan to remove the extract from your workbook or data source during migration. As always, the source workbook or data source will not be modified. The copy of the workbook or data source migrated to the destination project will have the extract removed from it. This effectively switches the data connection back to a live connection.

- **Refreshing Extracts after Migration**

  You can enable the Refresh Extracts After Migration option in your migration plan to have an immediate extract refresh task scheduled after the workbook or data source is migrated.

  We don’t recommend using the Refresh Extracts After Migration option if your migration plan also uses the Set Connection Info transformation to change the data
connection to point to a different set of data (for example, a different database server or database). When you change the connection information to point to different data and use the **Refresh Extracts After Migration** option, this can unintentionally expose data in a way that is a potential security issue.

For more information, see **Option 3: Refresh Extracts After Migration**.

**Changing data connections that use extracts**

Tableau data connections are either live connections that directly query a data source, or they are extracts of a data source. Extracts are copies or subsets of the original data and can be embedded in a workbook or data source. When present, the views will query data from the extract instead of the underlying data source.

Commonly, you’ll want to modify the data source connection during the migration so that it points to a different database in the destination project than it did in the source project.

For example, if you are migrating a workbook from your staging project to your production project, you will likely want to update the data connections inside the workbook to connect to your production database. You can implement this by using the **Set Connection Info** transformation in your migration plan. Now you have a migration plan which copies a workbook from staging to production and updates the data connections to point to the production database.

If your workbook uses an extract, additional work is required. In this scenario, the workbook will be migrated and the live data connection updated. However, the views will still show data from the staging database since it still contains the staging database extract - copied from the source (staging) project. There are a few ways to address this.

**Option 1: Use Published Data Sources**

You can change your workbooks so that they use published data sources instead. This way, the extract will be managed as part of the published data source and migrating updates to
the workbooks that use that data source can be simplified by not having to worry about the connection to the live database or the data extract.

**Option 2: Remove the Extract During Migration**

You can add a **Remove Extract** transformation to your migration plan. This will remove the extract from your workbook, effectively switching the data source to a live connection.

**Option 3: Refresh the Extract After Migration**

You can use the **Refresh Extracts After Migration** option in your migration plan. This will migrate the extract along with the workbook but will schedule an immediate extract refresh task for that workbook after the migration is complete.

This option is usually not recommended when used in combination with a **Set Connection Info** transformation because of potential security issues that it can introduce.

The issue is that the migrated workbook in your destination project will still show the old (source) extract data for the period between the completion of migration and the completion of the extract refresh task. If the extract refresh task fails, then the old/source extract data will remain until the extract is refreshed.

In a scenario like we’ve outlined above, migrating from a staging to production environment, this may be acceptable but you should be aware that the users of your workbooks may not be aware that the workbook is showing old/staging data due it being recently migrated and the extract not being refreshed yet.

In other scenarios where you may be using **Set Connection Info** to change data connections to point to a different set of customer or client data, this could introduce serious security issues where the workbook’s extract contains data from a different client or customer until the extract has been refreshed post-migration.

One way to mitigate this issue is to implement a 2-stage migration. This approach requires you to create two migration plans, one for each step described below and ensures the workbooks and data sources have an up-to-date extract before they are accessible.
Stage 1: Migrate your content to a project on your destination site that only administrators have access to. This migration allows you to use the Refresh the Extract After Migration option along with the Set Connection Info transformation to update the data connection, because no unauthorized users will have an opportunity to see the old data, even if the extract refresh fails.

Stage 2: After stage 1 is complete and you confirm there is a successful extract refresh, run a second migration plan to migrate the content from the stage 1 destination to the final destination where it is visible to end-users.

Who can do this

Tableau site user with an Explorer role or higher. To migrate content, you must have View and Download Workbook/Save a Copy permissions on the source site, and Publishing rights for the destination site. For more information, see Permissions.

Using the Tableau Content Migration Tool Console Runner

The Tableau Content Migration Tool includes a command-line utility for running migrations, tabcmt-runner.exe, located in the installation folder. The default installation folder is %PROGRAMFILES%\Tableau\Tableau Content Migration Tool.

Note: The tabcmt-runner.exe utility is not the same as the tabcmt.cmd command line utility which is used to configure the Content Migration Tool graphical application. For more information about tabcmt.cmd, see Using the Tableau Content Migration Tool Command Line Interface.

Usage:

- tabcmt-runner [options] <plan_file.tcmx>
- tabcmt-runner license --remove
- tabcmt-runner license <new license key>
- tabcmt-runner license <license file path> [--passphrase=<license file passphrase>]
- tabcmt-runner encryption --reset
Run Plan

Executes a migration plan immediately.

tabcmt-runner [options] <plan file>

Available options:

- --logfile=<file name> sets the file name to log output to
- --https=<secure|legacy> sets the HTTPS mode
- --quiet disables logging to stdout
- --src-user=<username> sets the username of the source connection
- --src-password=<password> sets the password of the source connection
- --dest-user=<username> sets the username of the destination connection
- --dest-password=<password> sets the password of the destination connection
Tableau Online Help

Exit codes:

- 0 indicates that the migration was successful.
- 1 indicates that the migration was successful but warning messages were logged.
- 2 indicates that the migration failed. Specific errors will be included in the log output.

Show Plan Summary

Shows a summary of the migration plan and then exits.

tabcmt-runner --info <plan file>

help

Shows usage information for the command line utility.

tabcmt-runner --help

version

Shows the current application version information.

tabcmt-runner --version

encryption

Reset the encryption key, or specify a new one. You must specify the encryption key before using the tabcmt-runner utility, even if you already done so from the Content Migration Tool UI.

tabcmt-runner encryption <new_key> | --reset

improvement

Default value: on

Enables or disables collection of anonymous usage information by the application. This information is completely anonymous and is sent periodically to Tableau to help us improve Content Migration Tool.
Examples

Show whether the improvement program is enabled or disabled:

```
tabcmt-runner improvement
```

Enable or disable the improvement program:

```
tabcmt-runner improvement <on|off>
```

license

Deprecated in July 2022.

This command is only applicable for legacy licenses. Manages a legacy application license for the current user. When using a legacy key, to use the `tabcmt-runner` utility you must activate the license using this command, even if you already activated it from the Content Migration Tool UI.

Examples

Show the current license information:

```
tabcmt-runner license
```

Set/activate a serial key or offline license key:

```
tabcmt-runner license <key>
```

Remove/deactivate the current license:

```
tabcmt-runner license --remove
```

Set/activate using a license file:

```
tabcmt-runner license <file path> [--passphrase=<password>]
```

script-warning

Default value: on

Shows a warning message when running a migration plan that includes migration scripts.
Note: This command updates your selection on the Settings page. For more information, see Tableau Content Migration Tool Settings.

Examples

Show if script warning is turned on or off.

`tabcmd-runner script-warning`

Turn script warning on or off

`tabcmd-runner script-warning <on|off>`

If turned on, you must include the option `--allow-scripts` to execute migration plans.

`tabcmd-runner --allow-scripts <plan file>`

Who can do this

To use the console runner, you must have all the following:

- Administrator permissions on the Content Migration Tool machine.
- Tableau site user account with an Explorer role or higher.
- View and Download Workbook/Save a Copy permissions on the source site.
- Publishing rights for the destination site.

Example: Scripting Migration Plans

Note: This topic includes a sample script you can use as the basis for scripting a multi-plan migration that satisfies your needs and environment. This script is intended to be used as a sample only, and not to be run as-is. For detailed instructions on using the console runner, see Using the Tableau Content Migration Tool Console Runner.

Tableau Content Migration Tool command line utility for running migrations can be used to automate the running of a migration plan from an external scheduler (such as Windows Task Scheduler) or from a custom script. The console runner only runs one migration plan (stored
in a .edt file) at a time. If you have a group of migration plans you want to run as a group, then you can use a custom script in combination with the Content Migration Tool console runner.

The example below is written in PowerShell and uses the console runner to execute a list of migration plans as a group.

The following example code demonstrates:

- Running multiple migration plans as a group using the console runner.
- Optionally halting deployment of the group of plans immediately when any single migration in the group fails.
- Using the console runner’s exit code to determine whether the migration failed or logged warnings.

```powershell
# List of migration plans to execute as a group.
$planFiles = @( 'customer 1.tcmx', 'customer 2.tcmx' )

# True of false whether to continue with the next plan if a migration fails.
$continueOnFailure = $false

# Path to the CMT console runner executable
$runnerExe = 'C:\Program Files (x86)\Tableau\Tableau Content Migration Tool\tabcmt-runner.exe'

# Store the exit code from the previously run migration plan.
$lastResult = -1

# Loop through and run each migration plan one at a time.
$planFiles | % {
```

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```powershell
$file = $_

if ($lastResult -ge 2 -and -not($continueOnFailure)) {
    Write-Warning "Skipping plan because previous migration failed. `nSkipped plan: $file"
    return
}

Write-Verbose "Running migration plan: $file"
& $runnerExe $file
$lastResult = $LASTEXITCODE

if ($lastResult -ge 2) {
    Write-Error "Migration failed. See output or log file for error details. `nPlan: $file" -ErrorAction 'Continue'
} elseif ($lastResult -eq 1) {
    Write-Warning "Migration completed with warnings. See output or log file for warning details. `nPlan: $file"
}
```

Who can do this

To script migration plans, you must have all the following:

- Administrator permissions on the Content Migration Tool machine.
- Tableau site user account with an Explorer role or higher.
- View and Download Workbook/Save a Copy permissions on the source site.
- Publishing rights for the destination site.

Using the Tableau Content Migration Tool Command Line Interface

The Tableau Content Migration Tool includes a command line interface, `tabcmt.cmd`, located in the installation folder. The default installation folder is
%PROGRAMFILES%\Tableau\Tableau Content Migration Tool (32-bit Windows) or %PROGRAMFILES(x86)%\Tableau\Tableau Content Migration Tool (64-bit Windows).

**Note:** The tabcmt.cmd utility is not the same as the Content Migration Tool console runner, tabcmt-runner.exe. The console runner is a separate command line utility used for running migrations from the command line. For information on using the Content Migration Tool console runner, see Using the Tableau Content Migration Tool Console Runner.

Here are the commands that can be used with the `tabcmt` command line:

- migrate
- help
- update
- version

**migrate**

Opens a migration plan file to the migrate step in the GUI:

```
tabcmt migrate <plan file>
```

**help**

Shows general help about the command line interface and the available commands.

**Examples**

Show all commands available:

```
tabcmt help
```

Show help and usage information for a specific command:

```
tabcmt help <command>
```
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**license**

Deprecated in July 2022.

This command is only applicable for legacy licenses. Manages the application license for the current user.

**Examples**

Show the current license information:

```
tabcmt license
```

Remove/deactivate the current license:

```
edt license remove
```

Set/activate a serial key or offline license key:

```
tabcmt license <key>
```

Set/activate using a license file:

```
tabcmt license <file path> [-passphrase=<password>]
```

**update**

Manages the options for application updates.

**Examples**

Show the current update settings:

```
tabcmt update
```

Enable or disable the automatic update notifications:

```
tabcmt update --disabled=<true|false>
```

Set the URL to detect/download updates from:

```
tabcmt update --url=<url>
```
Enable or disable showing beta updates. Set to false to only show stable release updates.

```
tabcmt update --beta=<true|false>
```

**version**

Shows the current application version information.

```
tabcmt version
```

**Who can do this**

To use the command line interface, you must have all the following:

- Administrator permissions on the Content Migration Tool machine.
- Tableau site user account with an Explorer role or higher.
- View and Download Workbook/Save a Copy permissions on the source site.
- Publishing rights for the destination site.

**Tableau Content Migration Tool Settings**

The Tableau Content Migration Tool default settings work in most cases, but you can change these if you need to, or if you are working with Tableau Support and they ask you to make changes.

To view or update the Content Migration Tool settings:

1. Open Content Migration Tool.
2. Click **Help > Settings**. The Settings dialog opens:
Diagnostics—Click Open Log Folder to open the logs location. Here you can view the logs, and zip them up if you need to send them to Tableau. For more information, see Tableau Content Migration Tool Log Files.
Select **Enable Network Tracing** if you are working with Support and they ask you to include a network trace in the logs. This applies until you clear the option or restart the Content Migration Tool.

**Security**—The encryption key is automatically generated on installation. If you change the encryption key, any migration plans with embedded passwords that were created with the previous key cannot be opened. If you have multiple installations of Tableau Content Migration Tool and want to share migration plans, you need to make sure the encryption key used by each instance of the tool is the same.

**Migration Scripts**—By default, a warning is displayed when running a migration plan that includes migration scripts or executables. Other users can edit these files, so verify that they’re safe before running the migration. Toggling this setting on and off will also update your warning preference for the console runner. For more information, see Using the Tableau Content Migration Tool Console Runner.

**Tuning**—In almost all cases you can leave these set to the defaults. If you are working with Support, they may ask you to change these settings.

**Temporary Files**—Select a location for temporary files if you want to change the default. This is the location where content is copied during a migration. You may want to change this if the default location does not have enough space to temporarily hold migrated content.

**Networking**—Selecting **Allow Legacy HTTPS Connections** gives you the ability to connect to Tableau Server installations running with older HTTPS configurations (for example, SSL v3). This is not recommended.

**Who can do this**

Typically, the tasks listed above can only be done by a user with Administrator access on the machine where Content Migration Tool is installed.
Tableau Content Migration Tool Log Files

Tableau Content Migration Tool generates log files when you run migrations. These can be helpful for troubleshooting problems.

**Note:** For information on all the Content Migration Tool settings, see Tableau Content Migration Tool Settings.

Content Migration Tool Log File Location

To find the Content Migration Tool log files from within the Content Migration Tool:

1. Start Content Migration Tool.
2. Click **Help** and **Settings**:

   ![Help and Settings](image)

   3. In the **Settings** dialog, click **Open Log Folder**:  

   ![Open Log Folder](image)
A window opens with the log files.

If you are working with Tableau Support and they ask you to send log files, zip the files up before you send them. For more information on sending log files to Tableau, see the Tableau Knowledge Base.

Who can do this

Typically, the tasks listed above can only be done by a user with Administrator access on the machine.