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Tableau Blueprint overview

The importance of data to the modern enterprise is no longer a topic of debate. The sheer volume of data that organisations are capturing, storing and organising continues to grow at a staggering pace. In an age of data, suddenly every company is a data company. Although the transformational potential of data is practically limitless, most companies still struggle to fully realise the value of their data. So how do you transform into a data-driven organisation?

Tableau is the trusted standard in modern analytics and business intelligence platforms, enabling your entire organisation to work smarter in its seamless end-to-end experience. Tableau provides powerful and intuitive analytics for users of all skill levels while integrating with your existing technology investments.

Realising the full value of your data means empowering everyone to make better decisions with it, and this cannot be done simply by choosing the right technology. As you chart your course to becoming a data-driven organisation with Tableau, it’s important to remember that you are not just deploying software – you are driving organisational transformation by prioritising facts over intuition, with data at the centre of every conversation. Your decisions should not only give people the right tools, but they must also enable the development of new skills, create new behaviour, encourage participation and recognise achievements to alter how the organisation uses data every day.

Driving change across your organisation requires effort and the coordination of multiple stakeholders and users with different and sometimes opposing – yet valuable – viewpoints and interests. Orchestrating change, and doing it efficiently, requires executive advocacy, as well as alignment and participation from a broad set of cross-functional participants to ensure the needs of the entire organisation are being met.

Tableau Blueprint is a step-by-step guide to becoming a data-driven organisation, whether your organisation is new to modern self-service analytics or you’ve already deployed and need to broaden, deepen and scale your use of data. Transforming how your company makes decisions every day is no easy task, but incorporating data and analytics into decision-making cycles is how you will see the most transformative impact on your organisation. Achieving that level of transformation requires a deliberate and holistic approach to developing your analytics practice. Although every organisation’s journey to developing a culture of self-service analytics will differ, Tableau Blueprint outlines the processes and best practices from thousands of customers.
This topic explains the core capabilities, the repeatable processes to empower more people to make data-driven decisions, and how to build a thriving data-driven mindset throughout your organisation.

Core capabilities of data-driven organisations

At the heart of every data-driven organisation, you will find three core capabilities: agility, proficiency and community. The three capabilities are supported by organisational intent, change management and trust.

A consistent approach to governance establishes guardrails around data and content security, access and processes, allowing you to create a trusted and secure analytics environment for every department, team and person in the organisation. Governance is central to all successful self-service analytics initiatives, and it will help your organisation start, grow and evolve its use of data and analytics.

Scaling these efforts also means measuring and proving their impact on the enterprise’s transformational goals with data and analytics. This means understanding which metrics best capture the cumulative impact of your iterative deployments, governance practices, increasing analytical skillsets and community growth. Suitable metrics – especially for measuring behavioural changes – will vary for each organisation and should be evaluated at regular intervals as analytics practices evolve.
Agility

Deployments must possess agility by operating on iterative, repeatable processes that begin with establishing a baseline architecture for a secure, stable and trusted server platform. Given that analytics becomes mission-critical, agile deployments with proactive monitoring will maintain sufficient availability, capacity and headroom while minimising resource contention. Because modern BI platforms often see fast growth, you will need to assess server utilisation and user engagement – and likely even change your topology – more frequently than with other enterprise technology platforms in order to remain responsive to the increased use of data and analytics.

This workstream is focused on deployment, monitoring and maintenance, which are typically IT-led efforts that rely heavily on understanding the broader business strategy and requirements.

- Deployment – Tableau Server leverages your existing technology investments and integrates into your IT infrastructure to provide a modern self-service analytics platform for your users. Your systems administrator and Tableau Server administrator will install and configure Tableau Server. A desktop administrator will deploy client applications to licensed users of Tableau Desktop and Tableau Prep Builder. For mobile use cases, Tableau Mobile can be published to your organisation’s mobile device management solution. Tableau deployment on page 63 walks you through the entire installation & configuration process and provides best practices along the way.
- Monitoring – Data is critical to doing analytics at scale. Ongoing, proactive hardware and application monitoring are required to deploy and operate Tableau and to meet business requirements and performance expectations of your user community. Without monitoring, a “set it and forget it” mentality will likely be met with inadequate resources that fail to support the workload of highly-engaged users. Administrators should work together to ensure per-
formance and stability of the platform to meet evolving business needs. For more information, see Tableau monitoring on page 91.

- Maintenance – Regular maintenance activities will keep your Tableau deployment running in top condition. You will operationalise change management processes to support the increased use of analytics, including performance tuning, load testing, capacity planning and upgrades. Monitoring data will be the driver behind many maintenance decisions. Tableau maintenance on page 103 outlines activities and tools to keep your deployment in optimal condition.

Proficiency

For people to skillfully analyse data that's relevant to their jobs to make decisions that drive the business forward, they must develop proficiency. Beyond data capabilities, this also means employees actively seek using data over decision-making by instincts or feelings. Maximising analytics investments and capitalising on the transformative potential of data means that everyone encountering it – regardless of skill levels and data fluency – must be able to turn data into insights.

This workstream is focused on user education, measuring adoption and engagement, and increasing data fluency within your organisation through best practices.

- Education – To integrate modern analytics into the fabric of your company, it’s essential to build scalable and ongoing learning plans for all your users by evaluating their relationship to data. Tableau education on page 113 will help you design and build the right education programs for your organisation.
- Measurement – Similar to the monitoring requirements to achieve agile deployment, measurement helps site administrators understand user behaviour, such as who is creating and consuming content, which is important for managing and growing your team’s use of analytics. For more information, see Measurement of Tableau user engagement and adoption on page 127.
- Analytics best practices – Enable your users with the cycle of visual analysis and repeatable processes for authoring content, then extend it with your own organisational standards. For more information, see Analytics best practices in Tableau on page 139.

Community

Community creates a network of users within your organisation who use data to share and collaborate. This will continue to drive adoption and learning around analytics and the insights they discover. The community leader will coordinate efforts to document enablement
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resources, connect users within your company and generate enthusiasm among a group of people founded on the common cause of putting data at the centre of every conversation. Internal user communities also benefit from integration with and support from the broader, global Tableau Community.

This workstream is focused on enabling user growth and evangelising analytics through communications, engagement activities and support.

- Communications – Establishing internal communications and user enablement resources promotes adoption to scale data and analytics more efficiently by guiding their learning and usage. **Tableau communications on page 165** outlines how to build a strong communication channels, including an enablement intranet, analytics blog/newsletter and discussion forums/chat.
- Engagement – While building excitement around the use of Tableau, engagement activities accelerate and reinforce the vision for modern analytics and ultimately, fuel your organisational transformation. Engagement activities are used to create and nurture an environment for more productive, results-driven people. **Tableau community engagement on page 175** defines types of activities to cultivate a thriving user community, including internal user group meetings, knowledge transfer sessions and competitions, as well as external community activities.
- Support – As your user base grows, it is critical to put the appropriate processes in place to efficiently and effectively support the user base. **Tableau support processes on page 183** defines ways of supporting users with traditional helpdesk support requests, Data Doctor, champion development and mentoring.

Developing a comprehensive plan and approach for each of the topics within these three workstreams will ensure that you are taking a holistic approach to accelerate company-wide adoption of data and analytics.

**Governed and trusted data**

Governance is the combination of controls, roles and repeatable processes that create trust and confidence in data and analytics within your organisation. In a traditional BI environment, governance is often seen as a way to restrict access or lock down data or content. Because it is commonly associated with traditional BI processes, there is a common misconception that governance runs counter to a self-service, modern analytics environment; however, governance takes on a different, yet equally important role in a modern analytics environment – where governance enables and empowers your people, instead of restricting them.
Simply put, governance makes self-service analytics possible. It provides the guidelines and structure needed to properly protect data and content, but also provides the permissions and access needed for a self-service environment to be successful. For this reason, a clearly defined governance framework is the anchor point of every data-driven company. The governance models you define will drive many decisions throughout the process, from providing the guidance necessary for the three workstreams to move forward, to developing the core capabilities to strengthen the data-driven decision-making in your organisation.

For self-service analytics to scale, governance needs to be collaborative. Both IT and business stakeholders on the project team are responsible for defining data and content governance. Shifting from an IT-led governance model does not mean IT relinquishes control so much as it means allowing the business to be more self-reliant within a trusted environment. Modern BI environments are implemented and scaled to benefit analysts and business users. As such, these users should all participate in maintaining the environment’s overall quality, including becoming a first line of defence in identifying data issues or irregularities within the agreed-upon governance models.

Acknowledging that every organisation is different, and every use case is different, varying degrees of governance are required. The data and content governance models can be right-sized and applied to any kind of data regardless of where it falls on the governance spectrum. Establishing three primary governance models – centralised, delegated and self-governing – provides the flexibility to satisfy the governance needs of most organisations. Like other Tableau platform management activities, an agile, iterative approach is needed to adapt to new business requirements as user adoption and engagement increase across your organisation. For more information, see Tableau governance models on page 59.

A repeatable process for Tableau Blueprint

Tableau Blueprint is a step-by-step guide to becoming a data-driven organisation. It provides concrete plans, recommendations and guidelines across critical foundational work and three primary workstreams that will turn repeatable processes into core capabilities. These topics will guide you through key decision points with a proven, repeatable, four-step process:

1. Discover – Gather information and perspectives from sponsors and multiple stakeholders about your enterprise architecture, the use of data and analytics among business teams, and analytical skills both present and needed.
2. Govern – Define controls, roles and repeatable processes to make the appropriate data and content available to the corresponding audience.
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3. Deploy – Establish the iterative, repeatable processes across the three major workstreams to install and configure software, educate users and enable communications.

4. Evolve – Monitor platform utilisation, measure user engagement and host engagement activities to promote and support the growing use of data and analytics.

For existing deployments, use this blueprint to assess your current capabilities – including where you are excelling and where there are areas for growth and improvement.

Step 1: Discover

Tableau Blueprint includes the Tableau Blueprint Planner, a comprehensive planning asset that will help you systematically gather the right information needed to link data with your strategic initiatives, define your analytics strategy, discover analytics use cases and assemble the Executive sponsor roles and responsibilities on page 17 and Tableau project team roles and responsibilities on page 20. This will ensure you are evaluating the needs of the organisation holistically, so you can scope a vision and strategy that will suit your entire organisation and grow with you over time. After completing discovery, you should have a greater sense of the direction you are heading in with your analytics strategy and the roles needed to execute on it. Discovery should be revisited as you expand to new users and use cases, but having a clear view of the future state will help you make decisions as you move forward.

Step 2: Govern

As mentioned above, a clear approach to governance is a pivotal point in the process and must be addressed early. Governance is pervasive throughout every workstream. The time invested up front to collaboratively define governance gives people confidence to trust the data, use it responsibly and participate in the processes that surround it. Tableau governance on page 27 covers all aspects of governance in Tableau and will help you determine the best approach for your teams, data and content. Working through the areas within data and content governance, you will define standards, policies and roles which perform the corresponding actions and processes in the governance models.

Step 3: Deploy

To scale analytics across the organisation with confidence, you need repeatable, iterative processes in the deploy stage as you execute on your analytics strategy. During the initial deployment, there needs to be coordination among the cross-functional team members to
install, integrate and configure the Tableau platform, educate users and provide organisation-specific enablement resources. After the initial deployment, you will onboard new teams and use cases with education and communication.

**Step 4: Evolve**

Your analytics strategy needs to keep pace with the growth of users, skillsets and use cases across the organisation. As processes evolve into capabilities, your users will adopt modern analytics, and you will adapt your operating models by delegating more responsibilities over time. The project team has access to several sources of information and data to tailor and tune your analytics environment to changing business needs. The project team will be responsive to the growing use of data and analytics among a diverse set of users by establishing a feedback loop to monitor and measure key metrics, including the business value achieved.
Analytics strategy

To ensure success with your analytics investment, your organisation needs a clearly defined vision for deployment. Inputs from people across the organisation are crucial to understand the short and long-term goals to promote data-driven decision-making. Your strategy must cover people, process and change management – including identifying immediate business use cases, defining roles and responsibilities, and establishing a schedule for evaluating success measurements and impact.

Valuable inputs from across the organisation will help to guide your analytics deployment and future state – including the roles, responsibilities, architecture and processes, as well as the success measurements needed to understand progress. After completing the Tableau Blueprint Planner, you should have a greater sense of the direction you are heading in with your analytics strategy.

Discovery process

The discovery process outlines a systematic approach to gathering information and perspectives from sponsors and multiple stakeholders about roles and responsibilities, enterprise architecture, and the use of data and analytics among business teams. Within each section, the team or role responsible for completing it is noted. Discovery is critical for gathering information from sponsors and stakeholders to inform the organisation’s analytics vision.

The Tableau Blueprint Planner contains questions you need to answer before deploying Tableau broadly. Your answers will inform activities at every stage and every workstream in the Tableau Blueprint. The following areas are covered within the planner:

- Analytics strategy
- Roles and responsibilities
- Enterprise architecture survey
- Data and analytics survey
- Use cases and data sources
- Users
- Community

The Tableau data and analytics survey on page 12, Tableau use cases and data sources on page 13, and Tableau users on page 15 sections of the planner should be
revisited as you expand to identify new data use cases and users from new departments and teams.

### Tableau roles and responsibilities

The Roles & responsibilities tab, found in the Tableau Blueprint Planner, helps to identify the cross-functional sponsor and project team members. The individuals you select will be responsible for understanding current/future state capabilities, goals and challenges. Depending on the size and scope of your deployment, the number of people may vary. For more information on roles and responsibilities, see the Executive advocacy and project team on page 17.

### Tableau enterprise architecture survey

The enterprise architecture survey assists IT with identifying what platforms and applications will be connected to Tableau. During the product evaluation period, some of the questions about hardware platform, availability, security and data were likely already considered, but prior to enterprise-wide deployment, it will be beneficial to take a closer look at who owns each system and coordinate resources needed to fully integrate Tableau within your enterprise architecture. Even if you have an existing deployment, the survey can be helpful in identifying gaps or what you might integrate next. For more information, see Tableau deployment on page 63.

Collect the following information about your enterprise architecture:

#### Hardware

- Where will you deploy – on-premises, public cloud or hosted?
- What are your enterprise standard build/specs? (cores, VM, RAM)
- What is your enterprise server operating system?

#### Availability

- Is Tableau Server mission-critical, requiring requiring high availability?
- What is the recovery time objective (RTO)?
- What is the recovery point objective (RPO)?
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Security

• What is your enterprise authentication protocol? (Active Directory, LDAP, SAML)
• What is your security policy for service accounts related to Tableau Server?

Network

• Is SSL required?
• What is your policy on gateway ports over HTTP/HTTPS?
• Are there any port restrictions?
• Is Internet access from servers permitted?
• Will users access the server externally?

Operations

• What are your enterprise software management tools? (server, client, mobile)
• What are your enterprise monitoring tools? (SCOM, Splunk, etc.)
• How many environments do you require for servers? (dev, UAT, prod)
• What processes exist for backup/restore?

Client software

• How is client software deployed – Desktop, Prep, Mobile?

External services

• Will you be integrating external services (R Server, Python, MATLAB, WMS)?

Automation & extensibility

• What are the requirements for automation, customisation? (APIs needed)

Licensing

• What is the licence type (role-based subscription, core, embedded)?
• Is there a chargeback model?

Data

• What database technologies (on-premises and cloud) are sources of data?
• What file-based sources of data will be used? (network folder access)
Tableau data and analytics survey

For line-of-business leaders, the data and analytics survey, found in the Tableau Blueprint Planner, identifies key sources of data, how data is distributed and consumed, and what analytical skills exist or need to be developed among their teams. Business teams who will be using Tableau should complete the data and analytics survey or work with an IT team member to facilitate documentation of the information. Consider every source of data – from CSV files, reports distributed via email and local database files to the enterprise data warehouse, cloud applications and external sources. This should be part of the onboarding process as new teams are added.

Each line-of-business leader should survey their teams for the following information:

Data selection and management

- What business problems/questions need to be solved/answered?
- How does your team source data? (Data warehouse, file exports, third-party)
- What are the key sources of data for the team?
- How often does the data change?

Security

- How is data secured?

Distribution

- How is data distributed?
- How frequently is data distributed?
- What formats are used?
- Who prepares reports for distribution?
- Who are the recipients?
Tableau Blueprint help

Consumption

- How is data consumed? New or replacement solution/report?
- Do consumers export and perform additional manipulation in context of your team?
- How is data used in the context of the recipient's job/role?

Skills

- What analytical skills and capabilities exist within the team?
- What analytical skills and capabilities need to be developed?
- Who will be identified and trained as the Tableau champions within the team?

Tableau use cases and data sources

To identify initial use cases, the project team should complete the Use cases and data sources worksheet, found in the Tableau Blueprint Planner, after the Tableau data and analytics survey on the previous page has been collected for each department/team to discover and prioritise which sources of data will make the biggest difference for participating business teams. When prioritising sources of data to publish and certify on Tableau Server, start with low complexity and high impact first to demonstrate quick wins. Publish and certify data sources, create workbooks to answer business questions. As new data sources are identified, they can be added over time. Beyond the initial use cases, this provides a repeatable process to add new data sources as the deployment progresses.

Use cases

If you are transitioning from a traditional top-down BI approach driven by IT or favour a phased delegation of responsibilities to governed self-service, it is advantageous for IT or a centralised BI team to build the initial use cases across departments, including certified data sources and dashboards.

Over time, as analytical skills increase and users are encouraged to ask and answer their own questions, the domain of available trusted content will grow organically into a wider range of analytic content for self-service.
From initial use cases to self-service

Ideas for initial use cases

In addition, Tableau provides dashboard starters for popular line-of-business applications to accelerate content authoring. Content consumers can view and interact with the initial use cases while they ramp up their analytical skills. After they complete some training, the initial use cases can become the starting point for build new content. Some common initial use cases by department are listed below:

- IT – Hardware/software asset inventory, helpdesk call volume/resolution time, resource allocation, security patch compliance
- Finance – Budget planning and spend, accounts receivable, travel expenses
- Marketing – Campaign engagement, web engagement, leads
- Human resources – Turnover rate, open headcount, new hire retention, employee satisfaction
- Sales – Sales/quota tracking, pipeline coverage, average deal size, win/loss rate
- Facilities operations – Physical locations, call centre volume/workload distribution, work request volume/resolution time

For more solutions in industries and departments, see How people use Tableau.
Tableau users

With the audience size estimated in the Use cases and Data sources tab, you will drill down one more level to list users. The Users tab of the Tableau Blueprint Planner helps you track individuals’ department, licence level, learning path and onboard date. Remember to designate at least one champion per department. Later, you will publish these names in the user directory on your enablement intranet, which is outlined in the communications guide. Collect the following information for each user or categorise by type of user:

- Name
- Department
- Licence level
- Site role
- Learning plan
- Onboard date
- Tableau champion?

Tableau community planning

The Community tab in the Tableau Blueprint Planner is focused on communications, engagement activities and support plans to connect people and nurture the use of analytics. Your organisation’s Tableau user community is just like Tableau’s community, only on a smaller scale. It’s comprised of all the Tableau users in your company. The community leader will coordinate efforts to collect enablement resources, connect users within your company and generate enthusiasm among a group of people founded on the common cause of putting data at the centre of every conversation.

Not all items listed on the Community tab are required for launch, and many will evolve over time. The following areas should be assigned to an owner with a due date:

Communications

- Getting started
- FAQ
- Support
- Announcements
- User directory
- Governance models
- Data platforms
- Certified data
- Analytics best practices
- Visual style guide
- Events calendar
- Learning plans
- Training videos
- Company education calendar
- User group recordings
- Analytics blog/newsletter
- Discussion forums and chat

**Engagement**

- Internal user group
- Internal admin group
- Lunch & learn
- Viz games
- Tableau Day/analytics day

**Support**

- User support process
- Champion development
- Skills pyramid
- Mentoring
Executive advocacy and project team

Becoming a data-driven organisation requires more than just choosing the right technology platform. It requires new skillsets, new processes, and changes in behaviour from all users within your organisation. Enterprise deployment requires effort and coordination across multiple stakeholders and users with different and sometimes opposing viewpoints and interests; however, each one will provide their own valuable perspective. Orchestrating this change, and doing it efficiently, requires buy-in, alignment and participation from a broad set of cross-functional stakeholders.

Executive sponsors working with the project team need to consider not only how to scale the technology for the entire organisation, but also the support, training and change management needed, as well as the ability to overcome any organisational roadblocks. Maximising analytics investments and capitalising on the transformative potential of data means that everyone encountering it – regardless of skill levels and data fluency – must be able to turn insights into opportunities or innovations.

Forming the cross-functional steering committee and project teams is the first step towards becoming a data-driven organisation. The input and skillsets of executives, IT and business stakeholders, and users are critical for buy-in, alignment and, ultimately, the project’s success. Together, they will be able to shape your organisation’s vision for modern analytics most efficiently, working towards the common goal of making secure, governed data access a reality.

The topics in this section outline the key roles for building a culture of analytics and how they are interconnected. The Roles and responsibilities tab of the Tableau Blueprint Planner will help you define and document your executive sponsor steering committee and project team members.

Executive sponsor roles and responsibilities

Before you deploy Tableau, you should identify executive sponsors. The executive sponsors set the vision for modern analytics, align projects to transformational initiatives, nominate staff for project and advocacy roles, and ensure accountability. They will serve as the governing body for the use of Tableau. The executive sponsors may also be known as a Tableau steering committee, Tableau council or analytics executive committee. Whatever name you choose, this cross-functional executive team will:
- Communicate and sell the vision for modern analytics across the organisation.
- Represent the interests of their respective departments to establish budget and funding.
- Align the use of analytics with strategic initiatives that drive organisational transformation.
- Approve Tableau governance on page 27 processes, policies, guidelines, roles and responsibilities for managing the organisation’s data in compliance with business and/or regulatory requirements identified by the project team.
- Set the example of using facts over intuition by placing data at the centre of every conversation in their department meetings as a visible and vocal user of the platform.

Given the diversity of use cases that arise within a company-wide initiative, the best way to monitor progress is to evaluate how deeply data is ingrained in the day-to-day activities of the organisation and how it impacts business decisions. KPIs may include the following: percentage of leadership engagement with Tableau content, such as content linked to strategic initiatives; using analytics to run meetings; and measures of department/team performance.

Initially, monthly meetings should be held to track the progress of the deployment and influence their teams to adopt Tableau. After an operational routine is achieved, meetings can transition to a quarterly schedule.

Depending on the size and scope of the deployment, the number of executive sponsors and titles (C-level, VP, etc.) may vary. Potential members of the executive steering committee are shown below.
Note: Depending on your organisational structure, the Chief Data & Analytics Officer (CDAO) or Chief Data Officer (CDO) role and roles reporting into it may reside under IT.

**Executive sponsor role**

<table>
<thead>
<tr>
<th>IT sponsor</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>The IT sponsor (CIO/CTO) is responsible for Tableau installation, configuration and maintenance, partners with business leaders and SMEs, enables secure, governed data access, and transitions content authoring to business users. Specific IT KPIs may include the following: percentage of content authored by business users vs. IT, percentage of data being available vs. analysed.</td>
<td></td>
</tr>
</tbody>
</table>

| Analytics sponsor | The analytics sponsor (CDO) implements the vision for modern analytics, ensures the availability of data and content, establishes education plans and learning paths by organisational job functions, facilitates communication throughout the user community, and aggregates business value achieved. |
Executive sponsor role

Specific analytics KPIs may include the following: percentage of all users trained, such as analytics skills in organisation or percentage of users who have increased their analytical skills.

Line-of-business sponsors (CFO, CMO, etc.) advocate for data-driven decision-making within their respective teams, promote content authoring and governed data access, encourage collaboration and sharing, and document business value.

Specific LOB KPIs may include the following: percentage of users within a team trained, amount of content published, user login frequency, days since last login, users who logged in once and didn’t return.

Tableau project team roles and responsibilities

The cross-functional project team includes IT/BI professionals, Tableau Server and site administrators, and selected content creators (data stewards and content creators). The cross-functional project team is focused on the following:

- Establish and maintain the analytics practice, which includes defining Tableau governance on page 27 processes, policies and guidelines.
- Define roles and responsibilities for managing the organisation’s data in compliance with business and/or regulatory requirements.
- Plan and execute the Tableau deployment and implement the organisation’s vision for modern analytics.
- Review policies and procedures periodically to adapt to and evolve with changing business needs.

Depending on the size of the organisation and the degree of specialisation for a particular role, you may find that each of the roles listed below equates to one person in a large organisation,
while more than one person may serve different roles in smaller organisations. What is most important is that each role is filled at the time it’s needed, rather than the number of people on the project team. The diagram below shows where the project team roles may sit in an organisational hierarchy (in larger deployments, community leaders may reside in each of the lines of business).

Note: Tableau Server supports multi-tenancy by allowing server administrators to create sites for segregating users and content and delegating responsibilities for administrative tasks.

**IT/BI professional roles**

The IT/BI professional roles are collectively responsible for integrating Tableau with your enterprise architecture and making data available in a secure, governed manner to Tableau users. Whether IT and analytics departments are combined or separate may vary from company to company. Their involvement is critical to planning, installation, configuration, and ongoing management and monitoring of the deployment.
Initially, weekly or bi-weekly meetings should be held to plan and track the progress of the deployment with the full project team. After an operational routine is achieved, meetings can transition to a lesser frequency unless you are planning upgrades, scaling server infrastructure or integrating with other systems.

### IT/BI professional role

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytics Director or IT Service Owner</td>
<td>The Analytics Director owns the use of Tableau, including placement and fit of analytics within the organisation, alignment with strategic initiatives, and user enablement and adoption.</td>
</tr>
<tr>
<td>Enterprise Architect</td>
<td>The Enterprise Architect identifies technical requirements and integrates Tableau with enterprise architecture standards.</td>
</tr>
<tr>
<td>Security &amp; Compliance Administrator</td>
<td>The Security &amp; Compliance Administrator ensures the company complies with its internal security and data security policies and external regulatory requirements.</td>
</tr>
<tr>
<td>Database Administrator</td>
<td>The Database Administrator is responsible for the administration, monitoring, maintenance and security of databases in the organisation. Coordinating with data engineers and data stewards, the DBA will provide data access and assist with modelling, structuring and optimising sources of data that connect to Tableau.</td>
</tr>
<tr>
<td>Systems Administrator</td>
<td>The Systems Administrator installs, configures, manages and maintains the hardware and operating system on which the Tableau Server is installed in the data centre or the cloud, while enforcing company policies in compliance with business and technology strategy.</td>
</tr>
<tr>
<td>Network Administrator</td>
<td>The Network Administrator maintains network communications and connectivity, including SSL, VPN and mobile networking to access Tableau Server.</td>
</tr>
</tbody>
</table>
### Tableau Blueprint help

<table>
<thead>
<tr>
<th>IT/BI professional role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Client Administrator</strong></td>
<td>The Client Administrator installs and configures client software including database drivers, Tableau Desktop, Tableau Prep Builder and Tableau Mobile.</td>
</tr>
<tr>
<td><strong>Project Manager</strong></td>
<td>The Project Manager ensures that the project is delivered on time and within budget by effectively staffing and managing relationships with a wide range of groups, allocating and utilising resources in an efficient manner, and maintaining a cooperative, motivated and successful team.</td>
</tr>
<tr>
<td><strong>Community Leader</strong></td>
<td>The Community Leader coordinates efforts related to user enablement, including support resources, engagement events, connecting users within your company and analytics evangelism. Note: Not all organisations will have a dedicated position for these responsibilities.</td>
</tr>
</tbody>
</table>

### Tableau administrator roles

Tableau Server administrators are responsible for the operation of the server application, while Tableau site administrators are responsible for their respective site(s), permissions, content and users when sites are used.

Initially, weekly or bi-weekly meetings should be held to track the progress of the deployment, server utilisation and user engagement with the full project team. After an operational routine is achieved, administrator meetings can transition to a monthly schedule unless you are planning upgrades, scaling the server infrastructure, or enabling new functionality, such as mobile, advanced analytics or extensible features.
Tableau content creator roles

Content creators include data stewards and content authors. It is important that the individuals who are selected for the project team have a good understanding of their business domain and data, as well as provide meaningful contributions to the development of organisational policies and procedures. The content creators identified on the project team are known as Tableau champions. For more information, see Tableau support processes on page 183.

During the initial deployment, data stewards and content authors should create certified data sources and relevant workbooks for content consumers to use at launch. Any bottlenecks or issues raised by this group should be shared with the full project team and/or executive governing body for consideration and resolution, depending on the stage of the deployment.
Initially, weekly, or bi-weekly meetings should be held to track the progress of the deployment, server utilisation and user engagement with the full project team. Weekly meetings for content creators should be held for sharing best practices, planning, and tracking the creation of content, workflow design, and content utilisation metrics. After an operational routine is achieved, meetings can transition to a monthly schedule unless you are testing upgrades or enabling new functionality, such as mobile, advanced analytics or extensible features.

<table>
<thead>
<tr>
<th>Content creator role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Stewards</td>
<td>Data Stewards understand the business domain and the interaction of business processes with analytics. A Data Steward ensures that there are documented procedures and guidelines for data access and use and will work with the Database Administrator and/or Data Engineers to plan and execute an enterprise-wide data governance and compliance policy. Data Stewards should have a Tableau Creator licence.</td>
</tr>
<tr>
<td>Content Authors</td>
<td>Content Authors create and publish dashboards and/or data sources. They will also be a resource for others ramping up their Tableau skills. Content Authors should have a Tableau Creator licence.</td>
</tr>
</tbody>
</table>

Tableau content consumer roles

Content consumers include everyone who uses Tableau to make data-driven decisions, including licensed Creators, Explorers and Viewers. While content consumers are not part of the project team, it will be useful to solicit feedback from them periodically to understand their ability to access data, create content and make data-driven business decisions.

Content consumers will provide valuable feedback throughout your deployment and upgrade cycles. The project team should collect their input during Tableau community engagement on page 175 activities and Tableau support processes on page 183. If common problems are identified, they should be addressed in the Getting started and FAQ areas of the Tableau enablement intranet on page 165.
Tableau governance

Perhaps the most important principle when adopting modern analytics is that self-service and governance are not at odds with each other. Self-service is designed to enable everyone to ask and answer their own questions using trusted data to make informed business decisions. Governance is central to Tableau Blueprint because it is governance that makes self-service possible. As the anchor point, governance will drive all decisions as the project team develops agility, proficiency and community across the organisation.

Governance is the combination of controls, roles and repeatable processes that creates trust and confidence in data and analytics. Both IT and business stakeholders on the project team are responsible for defining data and content governance together. In a successful self-service environment, the appropriate levels of governance create accountability and enable, rather than restrict, access to trusted content for users in your organisation. Governance is a spectrum: different kinds of data and content require different kinds of governance. It’s not a one-time effort because skills and expectations will evolve. Periodically evaluating governance processes will allow you to evolve and delegate more responsibilities as new analytical skills and use cases develop.

In Tableau, you govern two things: data and content. Data governance ensures the accuracy of the data driving your users’ decisions. Content governance helps business users to quickly and confidently find, share and use relevant workbooks and data sources. From soft guidelines to firm boundaries for the use of Tableau, organisations need to design their own governance models that comply with their internal policies and procedures, as well as overall business needs. Your organisation’s governance models should encompass both data and content management processes and the people who understand and comply with the established controls. Like other Tableau platform management activities, an agile, iterative approach is needed to adapt to new business requirements as user adoption and engagement increase across your organisation.

Defining the right balance of flexibility and control means you will realise the benefits of both self-service and governance:

- providing the right data to the right audience in a secure, governed operational model.
- Building the foundation for every data-driven decision.
- Establishing trust and confidence to drive business value.
- Documenting processes in a transparent, understandable and easily referenceable format.
• Contributing to the stability of the platform and reducing the proliferation of duplicate data and content with governed workflows.

This document walks through the modern analytics workflow and the role of governance within it, the areas of governance you need to consider, and finally the definition of governance models. Use this guide with the Data and content governance tab of the Tableau Blueprint Planner to assist in establishing your organisation’s standards, processes and policies to securely manage data and content.

Modern analytics workflow

The modern analytics workflow empowers people to ask and answer their own questions with data, enables people to easily share their insights with their team and the rest of the organisation, and ensures that the data supporting their decisions is accurate, trusted and secure. The workflow is comprised of five key actions: Access & view, interact, analyse & discover, share, and promote & govern.
Modern analytics workflow

The actions of the modern analytics workflow are executed by the following roles:

- **IT and/or BI professionals** – Tableau Server Administrators install, manage, monitor and maintain a Tableau deployment. Server administrators, or by delegation to site administrators and/or project leaders, perform user provisioning, maintain security and permissions, and provide governance oversight.
- **Content creators** – Tableau Creators are licensed with Tableau Prep Builder, Tableau Desktop and full Tableau Server authoring capabilities, including connecting to data, to create content. Tableau Explorers perform all authoring within Tableau Server’s web authoring with existing content. Site administrators and Tableau Creators or Tableau Explorers with the appropriate permissions can validate, promote and certify content.
- **Information consumers** – Tableau Viewers access, view and interact with content in Tableau Server, including on desktop, tablet and phone. Server and site administrators, Creators, and Explorers can consume content as well.
With increasing analytical skills, the boundaries between these roles become more fluid as someone can switch from consuming to creating to promoting content, given the appropriate licence and permissions.

**Governance in Tableau**

Governance in Tableau is a critical step in driving usage and adoption of analytics while maintaining the security and integrity of the data. You must define standards, processes, and policies to securely manage data and content through the modern analytics workflow. Just as important as defining these is having everyone in the workflow understand and comply so that users will have trust and confidence in the analytics they’ll use to make data-driven decisions.

To define your organisation’s Tableau governance models on page 59, you should work through the areas of data and content governance that are outlined in the diagram below.
Data governance in Tableau

The purpose of data governance in the Modern analytics workflow on page 28 is to ensure that the right data is available to the right people in the organisation, at the time they need it. It creates accountability and enables, rather than restricts, access to secure and trusted content and for users of all skill levels.

Data source management

Data source management includes processes related to selection and distribution of data within your organisation. Tableau connects to your enterprise data platforms and leverages the governance you already have applied to those systems. In a self-service environment, authors and data stewards have the ability to connect to various data sources, build and publish data.
sources, workbooks and other content. Without these processes, there will be a proliferation of duplicate data sources, which will cause confusion among users, increase likelihood of errors and consume server resources.

Tableau’s hybrid data architecture provides two modes for interacting with data, using a live query or an in-memory extract. Switching between the two is as easy as selecting the right option for your use case. In both live and extract use cases, users may connect to your existing data warehouse tables, views and stored procedures to leverage those with no additional work.

Live queries are appropriate if you have invested in a fast database, need up-to-the-minute data or use initial SQL. In-memory extracts should be used if your database or network is too slow for interactive queries, to take the load off transactional databases or when offline data access is required.

When publishing a workbook to Tableau Server, the author will have a choice to publish the data source or leave it embedded in the workbook. The data source management processes you define will govern this decision. With Tableau Data Server, which is a built-in component of Tableau Server, you can share and reuse data models, secure how your users access data, and manage and consolidate extracts with published data sources. Further, published data sources allow Tableau Creator- and Explorer-licensed users to have access to secure, trusted data in Tableau Server for web authoring and Ask Data. For more information, see Best practices for published data sources, Edit views on the web, and Optimise data for Ask Data.

With increased data discovery capabilities, Tableau Catalog indexes all content, including workbooks, data sources and flows to allow authors to search for fields, columns, databases and tables in workbooks and published data sources. For more information, see Data Management Add-on.

When Tableau Catalog is enabled, content authors can search for data by selecting from data sources, databases and files, or tables to search for data to see if it exists in Tableau Server and helps to minimise duplication of data sources.
In addition, the Data details tab on views published to Tableau Server will provide consumers with relevant information about the data used in it. Details include information about the workbook (name, author, date modified), the data sources used in the view and a list of the fields in use.

For data stewards who create new published data sources, the workflow below shows the two major decision points that impact data source management – live or extract and embedded or shared data model. This is not to imply that a formal modelling process must always occur before analysis begins.
To discover and prioritise key sources of data, use the Tableau data and analytics survey on page 12 and Tableau use cases and data sources on page 13 tabs in the Tableau Blueprint Planner.

Key considerations for data source management

- What are the key sources of data for a department or team?
- Who is the data steward or owner of the data?
- Will you connect live or extract the data?
- Should the data source be embedded or published?
- Do variants of a dataset exist? If so, can they be consolidated as an authoritative source?
- If multiple data sources are consolidated, does the single data source performance or utility suffer by attempting to fulfill too many use cases at once?
- What business questions need to be answered by the data source?
- What naming conventions are used for published data sources?

Data quality

Data quality is a measure of data's fitness to serve its purpose in a given context – in this case, for making business decisions. The quality of data is determined by factors such as accuracy, completeness, reliability, relevance and freshness. You likely already have processes in place to ensure data quality as it is ingested from source systems, and the more that is fixed in upstream processes, the less correction will be needed at the time of analysis. You should ensure data quality is consistent all the way through to consumption.
Tableau Blueprint help

As you are planning, it is a good time to review existing upstream data quality checks because data will be available to a larger group of users under a self-service model. In addition, Tableau Prep Builder and Tableau Desktop are great tools for detecting data quality issues. By establishing a process to report data quality issues to the IT team or data steward, the data quality will become an integral part of building trust and confidence in the data.

With the Tableau Data Management Add-on and Tableau Catalog, you should communicate data quality issues to your users to increase visibility and trust in the data. You can set a warning message on a data asset so that users of that data asset are aware of particular issues. For example, you might want to let users know that the data hasn't been refreshed in two weeks or that a data source has been deprecated. You can set one data quality warning per data asset, such as a data source, database, flow or table. For more information, see Set a data quality warning, including the following types: Warning, Deprecated, Stale Data and Under Maintenance.

Note that you can set a data quality warning using the REST API. For more information, see Add data quality warning in the Tableau REST API help.

Key considerations for data quality
What processes exist for ensuring accuracy, completeness, reliability and relevance?
Have you developed a checklist to operationalise the process?
Who needs to review data prior to it becoming shared and trusted?
Is your process adaptable to business users and are they able to partner with data owners to report issues?

Enrichment & preparation

Enrichment and preparation include the processes used to enhance, refine or prepare raw data for analysis. Often a single data source does not answer all the questions a user may have. Adding data from different sources adds valuable context. You likely already have ETL processes to clean, combine, aggregate and store data when ingesting raw data from various sources. With command line interfaces and APIs, Tableau can be integrated with your existing processes.

For self-service data preparation, Tableau Prep Builder and Tableau Prep Conductor should be used to combine multiple sources of data on a schedule. Tableau Prep Builder is part of the Tableau Creator licence, while Tableau Prep Conductor is part of the Tableau Data Management Add-On. Tableau Data Management helps you better manage the data within your analytics environment, from data preparation to cataloguing, search and governance, ensuring that trusted and up-to-date data is always used to drive decisions.

With visual, smart, direct feedback at every step, Tableau Prep Builder will help users to prototype and prepare disparate sources of data for analysis. Once the steps are defined and verified, the flow should be published to Tableau Server where Prep Conductor will execute the flow and output a published data source on the specified schedule. Automation creates a consistent process, reduces error-prone manual steps, tracks success/failure and saves time. Users will have confidence in the output because the steps can be viewed on Tableau Server or Tableau Online.
Tableau Prep flow published to Tableau Server

Key considerations for data enrichment

- Will data enrichment and preparation be centralised or self-service?
- What organisational roles perform data enrichment and preparation?
- What ETL tools and processes should be used to automate enrichment and/or preparation?
- What sources of data provide valuable context when combined with each other?
- How complex are the data sources to be combined?
- Will users be able to use Tableau Prep Builder and/or Tableau Desktop to combine datasets?
- Have standardised join or blend fields been established by the DBA to enable users to enrich and prepare datasets?
- How will you enable self-service data preparation?

Data security

Data security is of utmost importance in every enterprise. Tableau allows customers to build upon their existing data security implementations. IT administrators have the flexibility to implement security within the database using database authentication, within Tableau using permissions, or a hybrid approach of both. Security will be enforced regardless of whether users are accessing the data from published views on the web, on mobile devices, or through Tableau Desktop and Tableau Prep Builder. Customers often favour the hybrid approach for its flexibility to handle different kinds of use cases. Start by establishing a data security classification to define the different types of data and levels of sensitivity that exist in your organisation.

When leveraging database security, it is important to note that the method chosen for authentication to the database is key. This level of authentication is separate from the Tableau Server authentication (i.e. when a user logs into Tableau Server, they are not yet logging into the database). This means that Tableau Server users will also need to have credentials (their own username/password or service account username/password) to connect to the database for the database-level security to apply. To further protect your data, Tableau only needs read-access credentials to the database, which prevents publishers from accidentally changing the underlying data. Alternatively, in some cases, it is useful to give the database user permission to create temporary tables. This can have both performance and security advantages, because the temporary data is stored in the database rather than in Tableau.

In addition, extract encryption at rest is a data security feature that allows you to encrypt .hyper extracts while they are stored on Tableau Server. As of 2019.3, Tableau Server administrators can enforce encryption of all extracts on their site or enable users to encrypt all extracts associated with particular published workbooks or data sources. For more information, see Extract encryption at rest.
You can limit which users see what data by setting user filters on data sources. This allows you to better control what data users see in a published view based on their Tableau Server login. Using this technique, a regional manager can view data for their region but not the data for the other regional managers. With these data security approaches, you can publish a single view or dashboard in a way that provides secure, personalised data and analysis to a wide range of users on Tableau Server. For more information, see Data security and Restrict access at the data row level.

Key considerations for data security

- How do you classify different types of data according to its sensitivity?
- How does someone request access to data?
- Will you use a service account or database security to connect to data?
- What is the appropriate approach to secure data according to sensitivity classification?
- Does your data security meet legal, compliance and regulatory requirements?

Metadata management

Metadata management includes policies and processes that ensure information can be accessed, shared, analysed and maintained across the organisation as an extension of data source management. Metadata is a business-friendly representation of data in common terms, similar to a semantic layer in traditional BI platforms. Curated data sources make fields immediately understandable regardless of the data store and table from which they were sourced and hide the complexity of your organisation’s modern data architecture.

Tableau employs a simple, elegant and powerful metadata system that gives users flexibility while allowing for enterprise metadata management. A metadata model can be embedded in a workbook or centrally managed as a published data source with Data Server. After connecting to data and creating the data model, which will become a published data source, look at it from your users’ perspective and see how much easier analytics will be when they have a well-formatted starting point, filtered and sized to the business questions it can answer. For more information on published data source, visit Best practices for published data sources and Enabling governed data access with Tableau Data Server.

The diagram below shows where elements exist in Tableau’s metadata model:
• Data source – The data source has one or more live and/or extract connections and attributes for the database, the tables, views and columns to use, and joins or custom SQL used to access the data.
• Data model – Upon connection, Tableau automatically characterises fields as dimensions or measures. In addition, the data model stores calculations, aliases and formatting.
• VizQL model – The VizQL model enables users to adjust the role and aggregation of the fields at run time. This enables one user to define the base data source and data model as a collection of fields without needing to know, plan or otherwise account for all the variations of analysis to be performed with the data source by other users.
• Catalog – Tableau Catalog discovers and indexes all of the content on Tableau Server, including workbooks, data sources, sheets and flows.

Data stewards or authors with direct access to sources of data should prototype data sources as an embedded data source in a Tableau workbook and then create a published data source in Tableau Server to share the curated metadata model.
Direct access workflow

If authors do not have direct access to sources of data, they will rely on a DBA or data steward to provide the prototype data source embedded in a Tableau workbook. After reviewing and verifying it contains the needed data, a site administrator or project leader will create a published data source in Tableau Server to share the curated metadata model.

Restricted access workflow

The metadata checklist below shows best practices for curating a published data source. By establishing data standards using the checklist, you’ll enable the business with governed self-service data access that is user-friendly and easy to understand. Prior to creating an extract or published data source in Tableau Server, review and apply the following checklist to the metadata model:
- Filter and size to the analysis at hand
- Use standard, user-friendly naming conventions
- Add field name synonyms for Ask Data
- Create hierarchies (drill paths)
- Set data types
- Apply formatting (dates, numbers)
- Set fiscal year start date, if applicable
- Add new calculations
- Remove duplicate or test calculations
- Enter field descriptions as comments
- Aggregate to highest level
- Hide unused fields

Beginning in 2019.3 in the Data Management Add-on, Tableau Catalog discovers and indexes all of the content on Tableau Server, including workbooks, data sources, sheets and flows. Indexing is used to gather information about the metadata, schemas and lineage of the content. Then, from the metadata, Tableau Catalog identifies all of the databases, files and tables used by the content on your Tableau Server. Knowing where your data comes from is key to trusting the data, and knowing who else uses it means you can analyse the impact of changes on data in your environment. The lineage feature in Tableau Catalog indexes both internal and external content. For more information, see Use lineage for impact analysis.
Using lineage, you can trace down to content owners at the end of the lineage graph. The list of owners includes anyone assigned as the owner of a workbook, data source or flow, and anyone assigned as the contact for a database or table in the lineage. If a change is going to be made, you can email owners to let them know about its impact. For more information, see Use email to contact owners.

Key considerations for metadata management

- What is the process for curating data sources?
- Has the data source been sized to the analysis at hand?
- What is your organisational standard for naming conventions and field formatting?
- Does the metadata model meet all criteria for curation, including user-friendly naming conventions?
- Has the metadata checklist been defined, published and integrated into the validation, promotion and certification processes?

Monitoring & management

Monitoring is a critical piece of the self-service model, as it allows IT and administrators to understand how data is being used and be proactive and responsive about usage, performance, and data connectivity and refresh failures. Depending on your company’s database standards, IT will use a combination of tools and job schedulers for ingesting and monitoring raw data and server health.
Just as business users use data to make smarter decisions, administrators are also empowered to make data-driven decisions about your deployment with Tableau Server’s default administrative views and custom administrative views, which are made by analysing Tableau Server’s Repository data. Site administrators will use Tableau’s administrative views to monitor the status of extract refreshes, data source utilisation, and delivery of subscriptions and alerts. For more information, see Tableau monitoring on page 91 and Measurement of Tableau user engagement and adoption on page 127.

Key considerations for monitoring & management

- Are schedules available for the times needed for extract refreshes?
- How is raw data ingestion monitored from source systems? Did the jobs complete successfully?
- Are there duplicate sources of data?
- When are extract refreshes scheduled to run? How long do extracts run on the server? Did the refresh succeed or fail?
- Are subscription schedules available after extract refreshes have occurred?
- Are data sources being used? By whom? How does this compare with the expected audience size?
- What is the process for removing stale published data sources?

Data governance summary

Striking the balance between control and agility is critical. In spite of stringent governance policies, users often go down the route of saving sensitive data and analytics locally for quick analysis. In a self-service environment, the role of data governance is to permit access to data to enable users to get the answers they need while ensuring security is enforced. Although every organisation has different requirements, the table below describes the ideal state for governing self-service data access:

<table>
<thead>
<tr>
<th>Area</th>
<th>IT administrators / BI professionals</th>
<th>Content authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data source management</td>
<td>Provide access to sources of data and comply with organisational data strategy, policies and procedures.</td>
<td>Define, manage and update data models used for analysis.</td>
</tr>
</tbody>
</table>
**Tableau Blueprint help**

<table>
<thead>
<tr>
<th>Area</th>
<th>IT administrators / BI professionals</th>
<th>Content authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data quality</td>
<td>Define the process to validate data and build trust in its accuracy for decision-making.</td>
<td>Capture and expose data-cleansing rules applied to published data models.</td>
</tr>
<tr>
<td>Enrichment &amp; preparation</td>
<td>Create ETL processes from multiple sources of data to make data ready for analysis.</td>
<td>Capture and expose enrichment and preparation rules applied to published data models.</td>
</tr>
<tr>
<td>Data security</td>
<td>Define security parameters and access controls for published data models.</td>
<td>Comply with enterprise data security policies and external regulations.</td>
</tr>
<tr>
<td>Metadata management</td>
<td>Define organisational policies and processes for metadata management.</td>
<td>Define, update and expose field-level metadata for users.</td>
</tr>
<tr>
<td>Monitoring &amp; management</td>
<td>Monitor and audit usage to ensure compliance and appropriate use of data assets.</td>
<td>Monitor and track usage metrics for centrally managed data models.</td>
</tr>
</tbody>
</table>

**Content governance in Tableau**

As the use of analytics increases, a growing number of mission-critical business decisions will become data-driven. The net effect is not only an increase in content volume but also in the varying skill levels among its users who will be collaborating and uncovering valuable insights. With more and more people using data daily, it is critical that Tableau content can be secured, governed and trusted – as well as organised so that people can discover, consume and create content with confidence. Without content governance, users will find it increasingly difficult to find what they need among irrelevant, stale or duplicate workbooks.

Content governance involves the processes that keep content relevant and fresh, such as knowing when to decommission content because it’s not getting the expected traffic or finding out why no one is using an important dashboard for decision-making. The responsibility of ensuring compliance with an organisation’s content governance policies is a core responsibility of content authors.
This section provides IT administrators and business users with the core concepts underpinning Tableau’s content management features and guidance on how these concepts should be applied to manage the content created in a thriving modern analytics platform.

Content management

Defining a consistent content organisation structure allows administrators to manage content and makes content more discoverable by users. Tableau Server gives you the flexibility needed to structure your environment and manage content based on your specific governance requirements.

To isolate content, you can organise content on separate sites. This is known as multi-tenancy. Users of one site do not have access to another site or even awareness of its existence. Each site can have unique users, data and content. Sites work well when content can remain completely separate during all phases and there is little to no user overlap. Create a new site only when you need to manage a unique set of users and their content completely separately from all other Tableau users and content. While sites may initially seem like the easier option for segmenting data sources, workbooks and users, consider carefully whether there will be shared content across the organisation. For more information, see Sites overview (Windows | Linux).

Projects are a container for your workbooks, data sources and flows. They help you to create a scalable process for managing access to the content published to Tableau Server. They group together items and behave much like folders to provide hierarchical organisation. Projects and nested projects are used to group similar content with the corresponding levels of permission that administrators define. Permissions should be managed at the project level using groups for simplified administration. For more information, see Use projects to manage content access (Windows | Linux).

Content organisation structure

Depending on your requirements, content can be managed by organisational (by department/team), functional (by topic) or hybrid approaches. The deployment project team should work together to create a content organisation framework of different projects with
consistent naming conventions that include sandbox projects for ad-hoc or uncertified content, and production projects for validated, certified content. In a self-service sandbox project hierarchy, content authors can freely explore, author and perform ad-hoc analysis. Publishing to the production project is limited to a small group of users who will validate, promote and certify content in this location as trusted for data-driven decision-making. As business users create new content based on trusted data, these items will be certified and promoted to a production project. The process of content validation, promotion and certification is described later in this document. This ensures that the organisation’s primary data sources and dashboards are constantly improving and evolving.

An example of project hierarchies for marketing production, a marketing sandbox and marketing data sources are shown below. You should carefully consider your content organisation approach with respect to security and permissions requirements. In the marketing production and sandbox project hierarchies, permissions are set by the administrator and locked, while published data sources in the marketing data sources project are secured and permissioned at the level of each data source. Using this approach, marketing workbooks can be secured to only the marketing department, and marketing data sources can be accessed by specified groups outside of marketing who are granted permission. Having a separate sandbox hierarchy supports content review and promotion requirements.

Departmental project hierarchy

To provide a place for all individuals to securely save their work on Tableau Server, you should use a single personal sandbox and permissions to restrict content owners to only viewing their own items. Once ready, the user can publish their content to the department sandbox for the validation, promotion and certification process. This has the benefit of reducing administrative overhead by reducing the number of projects to secure and manage. Apply the permission to the personal sandbox project as shown below:
1. Create the personal sandbox project and lock content permissions to the project.

Permissions locked to the project

2. Set permissions for all users to Publisher on the project, None for workbooks, and None for data sources.

Publisher-only permissions

With personal sandbox content in a single location, administrators can monitor how often content is viewed, suggest owners delete stale content and check who is making the most use of the personal sandbox. Content owners can always see the content they own, even if it’s published in a project where they are denied the ability to view workbooks and data sources. Authorisation is explained in more detail in the next section.

Key considerations for content management
Tableau Blueprint help

- Will workbooks and data sources be shared across the company?
- Will sites be used to isolate sensitive content or departments?
- Will projects use an organisational (departments/teams), functional (topics) or hybrid approach?
- Have sandbox and production projects been set up to support ad-hoc and validated content?
- Are content naming conventions used?
- Are authors publishing multiple copies of the same workbook with different filters selected?
- Does content have a description and tags? Does it comply with visual styles?
- Do you have a load time expectation and an exception procedure in place?
- After employees leave the company, what is the process to reassign content ownership?

Authorisation

When a user attempts to log in to Tableau Server, authentication verifies a user’s identity. Everyone who needs access to Tableau Server must be represented as a user in Tableau Server’s identity store (Windows | Linux). Authorisation refers to what users can access on Tableau Server and how after they have been authenticated. Authorisation includes:

- What users are allowed to do with content hosted on Tableau Server, including site, projects, workbooks, views and data sources.
- What tasks users are allowed to perform to administer Tableau Server, such as configuring server settings, running command line tools, creating sites and other tasks.

Authorisation for these actions is managed by Tableau Server and determined by a combination of the user’s licence type, site role and permissions associated with specific entities such as workbooks and data sources. Tableau’s role-based licences have implicit governance built in because of the capabilities that are included with them. For more information on the specific capabilities of each licence, see Tableau for teams and organisations.

When you add users to a site on Tableau Server, independent of their licence 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.

Users with a Tableau Creator licence have access to Tableau Server, Tableau Desktop, Tableau Prep Builder and Tableau Mobile. The following site roles use a Tableau Creator licence:
<table>
<thead>
<tr>
<th>Site role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server administrator</td>
<td>Configure settings for the Tableau Server, all sites on the server, users and groups, and all content assets, such as projects, data sources (including connection information), and workbooks. Connect to Tableau published data sources or external data from the browser, Tableau Desktop or Tableau Prep Builder; create and publish new data sources; author and publish workbooks.</td>
</tr>
<tr>
<td>Site Administrator Creator</td>
<td>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 Builder; create new data sources; build and publish content.</td>
</tr>
<tr>
<td>Creator</td>
<td>Same access to site and user configuration as Site Administrator Creator, but cannot connect to external data from the web editing environment. Connect to Tableau published data sources to create new workbooks and edit and save existing workbooks.</td>
</tr>
</tbody>
</table>

On Tableau Server, server administrators can determine whether 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.

Data stewards (DBA or data analyst) publish data sources. Creators incorporate process definitions, policies, guidelines and business knowledge on enterprise metadata management in compliance with organisational and/or regulatory obligations.

Users with a Tableau Explorer licence have access to Tableau Server and Tableau Mobile. The following site roles use a Tableau Explorer licence:
Site role | Description
--- | ---
Explorer (Can Publish) | Publish new content from browser, browse and interact with published views, use all interaction features. In the web editing environment, can edit and save existing workbooks, and save new standalone data sources from data connections embedded in workbooks, but cannot connect to external data and create new data sources.

Explorer | 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 cannot save their work.

Users with a Tableau Viewer licence have access to Tableau Server and Tableau Mobile.

Site role | Description
--- | ---
Viewer | View and interact with filter content. Viewers can also receive alerts triggered by business events.

Users who have been added to Tableau Server but without a licence are unlicensed.

Site role | Description
--- | ---
Unlicensed | Unlicensed users cannot sign in to Tableau Server or Tableau Online.

Site roles along with content permissions determine who can publish, interact with or only view published content, as well as who can manage the site’s users and administer the site itself. The project team should work together to define the content permissions model. Tableau Server and/or site administrators will assign permission rules to groups and lock them to the project. Locked projects enforce permission rules on all content within the container, including nested projects. For more information, see [Set project default permissions and lock the project](#).
Tableau has default permission rules for projects, workbooks and data sources, or you can define custom permission rules for these content types.

<table>
<thead>
<tr>
<th>Permission rules template</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project leader</td>
<td>Combined with the appropriate site role, allows the user or group full access to the project, its child projects and content published into that project hierarchy.</td>
</tr>
<tr>
<td>Editor</td>
<td>Allows the user or group to connect to, edit, download, delete and set permissions for data sources or workbooks in the project. They can also publish data sources. Provided they are the owner of a data source they publish, they can also update connection information and extract refresh schedules. This permission is relevant for views when the view they access connects to a data source.</td>
</tr>
<tr>
<td>Publisher</td>
<td>Allows the user or group to publish workbooks and data sources to the project.</td>
</tr>
<tr>
<td>Connector</td>
<td>Allows the user or group to connect to data sources in the project.</td>
</tr>
<tr>
<td>Viewer</td>
<td>Allows the user or group to view the workbooks and views in the project.</td>
</tr>
<tr>
<td>None</td>
<td>Sets all capabilities for the permission rule to Unspecified.</td>
</tr>
<tr>
<td>Denied</td>
<td>Sets all capabilities for the permission rule to Denied.</td>
</tr>
</tbody>
</table>

Custom permissions allow more granularity in permissions – from accessing or downloading a data source to how a user interacts with published content. Tableau’s intuitive interface makes it easy to associate users to functional groups, assign permissions to the groups and see who
Tableau Blueprint help

has access to which content. For more information, see Set permissions on individual content resources

You should create groups locally on the server or import from Active Directory/LDAP and synchronise (Windows | Linux) on a set schedule. Synchronisation schedules are set by the Tableau Server administrator. To simplify maintenance, assign permissions to groups at the project level as shown below.

Tableau Server custom permissions

For more information, see Set up permissions quick start, Configure projects, groups and permissions for managed self-service, and Permissions reference.

Key considerations for authorisation

- What is the minimum site role for Active Directory/LDAP group synchronisation?
- Have you set all permissions for the All users group in the Default project to None?
- Are any explicit restrictions (Deny permissions) needed on the All users group to propagate to every user account?
- Have you created groups that correspond to a set of authoring and viewing capabilities for each project?
- Have you reviewed effective permissions on select users to test your permissions model?
- Have you locked permissions at the parent project to maintain security throughout the project hierarchy?
- Have service account usernames/passwords been established for published data sources?

Content validation

Content validation is the first step in a series of events that will culminate in content certification. Similar to the data quality area in data governance, content validation encompasses the processes which validate that content is accurate, complete, reliable, relevant and recent.
The first role to validate content should be its author. Authors should solicit feedback from the target audience as well. This can be done in an informal feedback group or by sharing a link to the workbook. Data stewards should also play a role to ensure accuracy and review an embedded data source as a potential candidate for publishing and certifying. If the data source is embedded in the workbook, the data steward should consider whether it is a potential candidate for publishing and certifying. Beyond data and calculation correctness, content validation should also include a review of the branding, layout, formatting, performance, filters, dashboard actions and edge case behaviours by the site administrator or project leader site roles.

Key considerations for content validation

- Who is involved in the validation process?
- Is the workbook accurate, complete, reliable, relevant and recent?
- Does the new content replace existing content?
- Are the underlying data and calculations correct?
- Does the workbook reflect corporate branding?
- Does the workbook have a logical layout?
- Are all axes and numbers formatted correctly?
- Do dashboards load within the acceptable performance time?
- Do filters and dashboard actions behave on the targeted views?
- Does the dashboard remain useful in edge case behaviours (filtered to all, none, one value, etc.)?

Content promotion

After content validation is complete, the process of content promotion is used to publish the workbook to a trusted project location or add the certification badge designation for published data sources. An example of a workbook workflow is shown below.
Workbook workflow

Content authors will connect to data, create new dashboards and publish to the sandbox project. Site administrators or project leaders will validate and approve the content. The approved content will be published to the production project. The Content Migration Tool, licensed as part of the Tableau Server Management Add-on, provides an easy way to promote or migrate content between Tableau Server projects. You can do this between projects on separate Tableau Server installations (for instance, between a development instance of Tableau Server and a product installation), or between projects on a single Tableau Server installation. The Content Migration Tool user interface walks you through the steps necessary to build a "migration plan" that you can use either a single time or as a template for multiple migrations.

If IT requirements mandate three separately licensed environments (dev, QA, and production), try not to replicate a traditional waterfall development cycle with a modern analytics platform. Users may favour the QA environment to circumvent stringent policies or delays to get content into production, so work towards a good balance by automating content migration to the production server with custom workflow scripts using Tableau’s REST APIs.

Key considerations for content promotion

- Who is involved in the promotion process?
- Do content-promoting roles have a checklist of criteria to evaluate?
- Have you clearly delineated between certified content and ad-hoc content by projects?
- Is the process agile, to support iterations and innovation?
- Do you have workflows to address both direct and restricted sources of data and workbooks?
Content certification

After content has been validated and promoted, it achieves a trusted, certified status when a site administrator, project leader or publisher (content author or data steward) with the appropriate permission for the production project promotes the workbook or data source to the designated location. Certification makes content discoverable by content consumers and improves data stewards’ abilities to govern enterprise-wide data more effectively in Tableau by reducing the proliferation of duplicate workbooks and data sources.

Use the baseline requirements that were established for content validation as the criteria for becoming certified in key considerations for content validation. Content authors should have a clear understanding of how the certification process works from start to finish, and content consumers should know where certified content is published in the production project, as defined by your content management standards.

Data source certification enables your data stewards to promote specific data sources in your Tableau deployment as trusted and ready for use. Certified data sources get preferential treatment in Tableau Server search results and in our smart data source recommendations algorithm so that they are discoverable and easily reusable.

Certified data source

Key considerations for content certification
Tableau Blueprint help

- Who is responsible for designating certified content?
- Have all criteria for achieving certification status been met?
- Are all fields completed: about, certification notes, tags?

Content utilisation

Content utilisation is a measurement of the effective use of the data for business decisions, but the complete picture cannot be told through traffic to views alone. Measurement of content utilisation helps your deployment to operate at scale and evolve by understanding user behaviour – who creates and consumes content, and the quality and relevance of the dashboards and data sources. If content isn’t being consumed, you will be able to identify it and take the appropriate next steps.

Server administrators should monitor broad usage patterns across the organisation. Site administrators should measure and audit usage of published content – both certified and ad-hoc – within their site. For example, if ad-hoc content utilisation is significantly higher than certified content utilisation, perhaps the promotion process is too restrictive or takes too long for business needs.

Site administrators should review content utilisation in the context of the expected audience size that was documented on the Tableau use cases and data sources on page 13 tab of the Tableau Blueprint Planner. Individual content authors should also review utilisation for their content in the sparkline tooltip by hovering over the workbook’s thumbnail or selecting Who has seen this view from the menu. For more information, see the Measurement of Tableau user engagement and adoption on page 127.

Key considerations for content utilisation

- How much traffic goes to each view?
- What is the definition of stale content? How often is stale content purged?
- How much indirect utilisation (alerts & subscriptions) occurs?
- Are subscriptions delivered on time?
- Does the actual audience size match with expectations?
- Does content follow a weekly, monthly, quarterly trend?
- What is the frequency of login or days since last login by user cohort?
- What is the distribution of workbook and data source size?
Content governance summary

The table below defines the ideal state for promoting and governing content in a thriving modern analytics deployment:

<table>
<thead>
<tr>
<th>Area</th>
<th>IT administrators/BI professionals</th>
<th>Content authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content management</td>
<td>Create and maintain an environment for storing and organising published content.</td>
<td>Ensure content in their site or project is relevant.</td>
</tr>
<tr>
<td>Security &amp; permissions</td>
<td>Secure analytical content and grant users the appropriate levels of access based on content type, sensitivity, business need, etc.</td>
<td>Comply with organisational security and permissions policies.</td>
</tr>
<tr>
<td>Content validation</td>
<td>Confirm that the process for validating content is correct.</td>
<td>Access platform capabilities to assist with validation and accuracy verification of user-generated analytical content.</td>
</tr>
<tr>
<td>Content promotion</td>
<td>Define process for promoting content.</td>
<td>Promote validated analytical content to a centralised, trusted environment as determined by the governance process.</td>
</tr>
<tr>
<td>Content certification</td>
<td>Define process for certifying content.</td>
<td>Certify content as trusted and delineate from untrusted content in the same environment.</td>
</tr>
<tr>
<td>Content utilisation</td>
<td>Measure broad usage patterns across organisational business units.</td>
<td>Measure and audit usage of published content and track usage.</td>
</tr>
</tbody>
</table>
Tableau governance models

Acknowledging that every organisation is different, and every use case is different, varying degrees of governance are required. The data and content governance models can be right-sized and applied to any kind of data regardless of where it falls in the governance spectrum. Establishing three primary governance models – centralised, delegated and self-governing – provides the flexibility to satisfy the governance needs of most organisations.

Like other Tableau platform management activities, an agile, iterative approach is needed to adapt to new business requirements as user adoption and engagement increase across your organisation. Processes will change over time as skills increase and responsibilities are delegated more broadly than the IT organisation. Establish governance review points twice a year to continue to evolve the models.

The Data and content governance tab in the Tableau Blueprint Planner will help you to define your organisation’s governance models based on information collected in the Tableau enterprise architecture survey on page 10 and Tableau data and analytics survey on page 12. You should establish and document who is responsible and what processes support each area within each model: centralised, delegated and self-governing.

Using the matrix approach to separate data and content governance and segmenting by the three models, it is easy to mix and match across models. For example, data and content governance may be centralised at the start. Then, after user training, data governance areas may be centralised, but content governance is delegated or self-governing because the data is curated. Similarly, specific areas within data and content governance, such as delegated metadata management and centralised security and permissions, can be tailored to meet your unique requirements. As business users’ analytical capabilities grow, more responsibilities can be delegated over time. Once defined, the governance models should be communicated to the user community by publishing them to the enablement intranet. For more information, see Tableau enablement intranet on page 165.
Centralised

In a centralised model, IT or another authority owns data access and produces data sources and dashboards for business consumption in a one-to-many manner by a small number of Creators and everyone else as Viewers. Centralised governance is required for maintaining control of highly sensitive data.

Addressing a skills gap among the target audience is another case where centralised management is necessary. You can still provide business users with prepared content to make data-driven decisions while they build their analytical capabilities.

If you are transitioning from a traditional, top-down analytics approach driven by IT or favour a phased delegation of responsibilities to governed self-service, it may be advantageous for IT or a centralised BI team to build the initial use cases across departments, including certified data sources and dashboards.

Over time, as users are encouraged to ask and answer their own questions, the domain of available trusted content will grow organically with the teams and departments, and users will have access to a wider range of analytical content for self-service. To avoid the risk of recreating a “report factory” delivery model, establish goals and dates to evolve beyond the centralised governance model and to begin delegating responsibilities.

Delegated

In a delegated governance model, new roles are introduced outside of IT or a central authority. Site administrators and data stewards are identified and may have direct access to sources of data. Content authors have access to certified published data sources to ask and answer their own business questions, while some content consumers are given web authoring capabilities to save derivative content to sandbox projects. Processes for validating, promoting and certifying content are introduced but still may be limited. There is increasing collaboration between IT and business users as IT shifts from a provider of reports to an enabler of analytics.

Self-governing

In a self-governing model, there is strong collaboration between IT and business users. Certified content and data sources are available, and ad-hoc content is being created regularly by Creators and Explorers. Viewers understand the delineation between certified and ad-hoc, sandbox content states. The process of validation, promotion and certification is well defined and well understood by users of all skill levels. With increasing analytical skills across the
organisation, the boundaries between the roles of the modern analytics workflow are fluid as users switch from consuming to creating to promoting content with the appropriate level of permissions.
Tableau deployment

Prioritising data and analytics couldn’t come at a better time. Your company, no matter what size, is already collecting data and most likely analysing just a portion of it to solve business problems, gain competitive advantages and drive enterprise transformation. With the explosive growth of enterprise data, database technologies and the high demand for analytical skills, today’s most effective IT organisations have shifted their focus to enabling self-service by deploying and operating Tableau Server at scale, as well as organising, orchestrating and unifying disparate sources of data for business users and experts alike to author and consume content.

Tableau Server leverages your existing technology investments and integrates into your IT infrastructure to provide a self-service, modern analytics platform for your users. During the discovery stage, IT completed the Tableau Blueprint Planner’s Tableau enterprise architecture survey on page 10 and collected the Tableau data and analytics survey on page 12 from departments and teams within your organisation. The enterprise architecture survey helps you identify your enterprise standards and processes for the technology and platforms that you will integrate with Tableau. Depending on your organisational roles and responsibilities, Tableau Server should be installed by a systems administrator and the designated Tableau Server administrator in coordination with the corresponding IT roles. The data & analytics survey, completed by business teams, identifies and prioritises data use cases, audience size and users. You will use the information collected in both surveys to plan your deployment strategy, including sizing, installation and configuration of your Tableau Server. In addition to installing Tableau Server, administrators will also need to plan for installation of Tableau Prep Builder, Tableau Desktop and Tableau Mobile, where applicable.

This document covers system integration and deployment best practices. It will help you plan your deployment strategy. Prior to installation, review Planning (Windows | Linux) and Baseline configurations (Windows | Linux). For full documentation, visit Get started with Tableau Server (Windows | Linux).

Tableau Server architecture

Tableau Server is a collection of processes that work together to provide a full modern analytics platform for your users. Multiple server processes work together to provide services in various
tiers. To learn how the processes work together, see Tableau Server processes on Tableau Public.

For more information on specific processes, see below:

- Tableau Server Administration Agent
- Tableau Server Application Server
- Tableau Server Backgrounder Process
- Tableau Server Cache Server
- Tableau Server Client File Service
- Tableau Server Coordination Service
- Tableau Server Data Engine
- Tableau Server Data Server
- Tableau Server File Store
- Tableau Server Gateway Process
- Tableau Server Microservice Containers
- Tableau Server Repository
- Tableau Server SAML Service
- Tableau Server Search and Browse
- Tableau Server Service Manager
- Tableau Server Administration Controller Process
- Tableau Server TSM Maintenance Services
- Tableau Server VizQL Server
- Tableau Prep Conductor
- Tableau Server Dynamic Topology Changes
- Server Process Limits
Hardware platform

Tableau Server can be installed on-premises with physical or virtual machines or in the cloud and supports Windows or Linux operating systems. To determine your hardware platform and sizing, consider these variables: your environment, sources of data and management to provide self-service data access, potential workload from all users and actual usage data. If this is the first time you are deploying Tableau Server, you should focus on your environment standards and sources of data. For existing deployments, you will analyse Tableau Server data to evaluate workload and usage in addition to environment and sources of data.

Deployment type

Tableau prioritises choice and flexibility to fit, rather than dictate, your enterprise architecture. With on-premises, cloud and hosted options, there is a version of Tableau to match your requirements. Below is a comparison of the three types:

<table>
<thead>
<tr>
<th>Type</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableau Server -</td>
<td>Full control of hardware and software</td>
<td>Need dedicated administrators to manage hardware and software</td>
</tr>
<tr>
<td>On-premises</td>
<td>Infrastructure and data remain behind your firewall</td>
<td>Additional infrastructure needed to access off-network (mobile, external)</td>
</tr>
<tr>
<td>Tableau Server -</td>
<td>Full control of software on managed hardware</td>
<td>Need dedicated administrators to manage software</td>
</tr>
<tr>
<td>Public cloud (IaaS)</td>
<td>Puts infrastructure in same place as data (for migration to cloud)</td>
<td>Additional infrastructure needed to access off-network (mobile, external)</td>
</tr>
<tr>
<td></td>
<td>Flexibility to spin up/down hardware as needed</td>
<td></td>
</tr>
<tr>
<td>Tableau Online</td>
<td>Fully hosted solution (hardware, software upgrades)</td>
<td>Single site in multi-tenant environment</td>
</tr>
<tr>
<td>(SaaS)</td>
<td>Fast to deploy</td>
<td>Connection to on-premises data handled through Tableau Bridge</td>
</tr>
<tr>
<td>Type</td>
<td>Pros</td>
<td>Cons</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>access</td>
<td></td>
<td>Authentication via SAML or Tableau ID</td>
</tr>
</tbody>
</table>

**Hardware requirements**

Regardless of where you choose to deploy Tableau Server, properly-sized hardware is critical. Your planning should align with evolving business needs by assessing server utilisation and user engagement more frequently, scaling more frequently and changing topology more frequently than other software applications. Review the corresponding link to the hardware platform that fits your enterprise standards:

- Recommended baseline configurations ([Windows](#) | [Linux](#))
- Tableau Server on VMware VSphere
- Selecting an AWS instance type and size ([Windows](#) | [Linux](#))
- Selecting a Google Compute Engine virtual machine type and size ([Windows](#) | [Linux](#))
- Selecting a Microsoft Azure virtual machine type and size ([Windows](#) | [Linux](#))

Your Tableau account team is available to assess your requirements and assist with sizing. In an initial deployment of Tableau, you should estimate 600-800 Explorers per 8-core node, assuming 10% active users (interactive, concurrent requests made to Tableau Server, including consuming dashboards on a laptop or mobile device, web authoring, and connecting to and querying published data sources). This is only a starting point and should not be considered a hard sizing rule beyond the initial deployment. Memory should be at least 8 GB of RAM per core for a production server. For less than 40-core clusters, use 8-core nodes, and in clusters greater than 40-cores, use 16-core nodes. The relative workload of each licence type must be factored into hardware sizing. Assuming an Explorer counts as 1 user, a Creator has a relative workload of 2.4 users, while a Viewer has a relative workload of 0.75 of a user. Using these workload coefficients, you can estimate the cluster’s capacity. The following table shows examples of equivalent workloads on each row:

<table>
<thead>
<tr>
<th>Creators</th>
<th>Explorers</th>
<th>Viewers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workload 1</td>
<td>25</td>
<td>300</td>
</tr>
<tr>
<td>Workload 2</td>
<td>50</td>
<td>333</td>
</tr>
</tbody>
</table>
The actual workload of Creators, Explorers and Viewers may vary with usage of Tableau Server features, such as frequency of connecting to data and web authoring, as well as viewing and interacting with content. As users are on-boarded and start creating and consuming content, you should monitor the hardware and content utilisation to make informed decisions on server sizing using data from hardware monitoring tools and Tableau Server’s Repository. For more information, see Tableau monitoring on page 91 and Measurement of Tableau user engagement and adoption on page 127.

Scalability

In both new and existing deployment scenarios, the goal is to proactively maintain sufficient availability, capacity and headroom and minimise resource contention. Like other enterprise platforms, Tableau Server scales up by adding processor, memory and/or disk capacity, or scales out by adding more nodes to a cluster. Tableau Server scales nearly linearly with the addition of hardware resources, according to your unique environment, data, workload and usage mix. Load testing and capacity planning should be conducted regularly, as outlined in Tableau maintenance on page 103.

Scalability and performance are heavily dependent on external systems, such as sources of data, volume of data, network speeds, user workloads and workbook design, which can change rapidly as deployments progress. For example, assuming a correctly-sized hardware configuration for the initial deployment, unplanned user onboarding, unmonitored utilisation, inefficient workbooks, suboptimal data extract design and peak-hour refresh schedules can have a major impact on server performance and user experience, causing performance to degrade from the cumulative effect of the separate incidents. For more information, see the Tableau Server scalability white paper.
Server environments

In addition to your production environment, Tableau recommends one test environment for testing upgrades and server topology changes. Your production environment will support modern analytics using production and sandbox projects with content validation, promotion and certification processes – all in one environment. For more information on these content management processes, see Tableau governance on page 27. The production and test environments should have identical hardware specs, server topology and configuration. This will allow administrators to test upgrades and participate in beta programmes in the test environment by restoring back production content.

Some organisations have IT policies that require three environments – Development, QA, and Production – to isolate use cases for content development, testing and consumption into separate Tableau Server installations. If this is a requirement for your organisation, each of the three environments must be licensed separately, as they would be considered three production environments as defined in Tableau’s End User Licence Agreement. The production and test environments should have identical hardware specs, server topology and configuration. If you are required to run three separate environments, try not to replicate a traditional waterfall development cycle with a modern analytics platform. Users may favour the QA environment to circumvent stringent policies or delays to get content into production, so work towards a good balance by automating content migration to the production server with the Content Migration Tool found in the Tableau Server Management Add-on or custom workflow scripts using Tableau’s REST APIs. The development environment does not have to have identical hardware specs to the production and QA environments, unless the development environment is used for upgrade testing or participation in beta programmes.

High availability

You should install and configure Tableau based on your availability requirements and add additional nodes for capacity and/or for high availability (Windows | Linux). To support mission-critical use cases, you should deploy a high-availability (HA) cluster configuration with an external load balancer (Windows | Linux).

An HA installation of Tableau Server has a minimum of three nodes and multiple redundant instances of key processes (the Repository, file store/Data Engine and coordination service) on different nodes. The goal is to minimise system downtime by eliminating single points of failure and enabling detection of failures with failover where possible. For more information, see the Tableau Server high availability white paper.
Follow the pattern below to build your HA cluster:

1. Install the initial node and allow the architecture-aware smart installer to configure processes (Windows | Linux). The active Repository is on Node 1.
2. Replicate the process configuration on other VizQL nodes, ensuring redundancy (Windows | Linux). The passive Repository is on Node 2. Node 3 processes will mirror Nodes 1 and 2, except there will be no Repository process on it.
3. Add Coordination Service Ensemble and Client File Service (Windows | Linux).
4. Add the external load balancer (Windows | Linux).

A 3-node Tableau Server HA deployment (note: Coordination Service and Client File Service are not explicitly shown)

The need for specialised nodes evolves over time. Extract-heavy and frequent extract refresh workloads should be isolated from the interactive visualisation-rendering workload. In an extract-heavy environment, most data sources are extracts. Having a few extremely large extracts could put your deployment in this category, as would having many small extracts. Deployments where extracts are frequently refreshed, such as several times a day during business hours, should be isolated on specialized backgrounder nodes. To isolate the workload of the backgrounder process, add specialized backgrounder nodes, ensuring redundancy, as shown in Nodes 4 and 5 below. Using node roles, you can configure where certain types of workloads are processed on your Tableau Server installation. The node roles features allows
You can dedicate and scale resources to specific workloads. For more information on configuring node roles for back grounder and file store, see Workload management through node roles.

A 5-node Tableau Server HA deployment (note: Coordination Service and Client File Service are not explicitly shown)

Starting in 2019.3, you can deploy Tableau Server Repository to Amazon Relational Database Service (RDS). The Tableau Server Repository is a PostgreSQL database that stores data about all user interactions, extract refreshes and more. Amazon RDS offers scalability, reliability, high availability and security built in for PostgreSQL. By integrating with AWS to configure an external repository for Tableau Server, you will be able to take advantage of these additional benefits of the cloud. For more information, see Tableau Server external repository.

Disaster recovery

When planning for disaster recovery (DR) in your Tableau environment, there are two main factors to consider: Recovery time objective (RTO) and recovery point objective (RPO). The RTO is a measure of how much downtime your business can accept before a full recovery, and it influences how often you restore your backups to an alternative cluster and the amount of infrastructure investment. The RPO, a measure of how much data loss your business can tolerate, influences how often you will need to take backups of your system. For Tableau
Server the RPO cannot be shorter than the time it takes to complete a full backup of your server. The table below illustrates how to plan for a range of RTO requirements:

<table>
<thead>
<tr>
<th>High RTO</th>
<th>Medium RTO</th>
<th>Low RTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>New hardware/VMs obtained in case of an outage</td>
<td>Machines are provisioned but not running</td>
<td>Dedicated hardware that is always running with identical configuration and topology to production</td>
</tr>
<tr>
<td>Install Tableau Server</td>
<td>Tableau Server installed</td>
<td>Backups are restored regularly to the DR environment</td>
</tr>
<tr>
<td>Restore backup to the new environment</td>
<td>Restore latest backup to the cold standby environment</td>
<td>External load balancer/DNS routing that can be updated to point to the DR environment</td>
</tr>
<tr>
<td>Several hours or days</td>
<td>A few hours</td>
<td>Within minutes</td>
</tr>
</tbody>
</table>

Authentication and authorisation

Tableau Server provides the comprehensive features and deep integration needed to address all aspects of enterprise security. For more information, see Tableau Server platform security and the security hardening checklist (Windows | Linux).

Identity store

Tableau Server requires an identity store (Windows | Linux) to manage user and group information. There are two kinds of identity stores: local (Tableau Server) and external (Active Directory, LDAP). When you install Tableau Server you must configure either a local identity store or an external identity store. For information about configuration options for the identity store, see identityStore entity.

When you configure Tableau Server with a local identity store, all user and group information is stored and managed in the Tableau Server Repository. In the local identity store scenario, there
is no external source for users and groups. Note: Changing the identity store after server installation requires a full uninstall and reinstall.

When you configure Tableau Server with an external store, all user and group information is stored and managed by an external directory service. Tableau Server must synchronise with the external identity store so that local copies of the users and groups exist in the Tableau Server Repository, but the external identity store is the master source for all user and group data. When users sign in to Tableau Server, their credentials are passed to the external directory, which is responsible for authenticating the user (Windows | Linux). Tableau Server does not perform this authentication; however, the Tableau user names stored in the identity store are associated with rights and permissions for Tableau Server. After authentication is verified, Tableau Server manages user access (authorisation) for Tableau resources.

Authentication

Authentication verifies a user's identity. Everyone who needs to access Tableau Server – whether to manage the server or to publish, browse or administer content – must be represented as a user in the Tableau Server identity store. The method of authentication may be performed by Tableau Server (local authentication), or authentication may be performed by an external process. In the latter case, you must configure Tableau Server for external authentication technologies such as Active Directory, OpenLDAP, SAML or OpenID. In all cases, whether authentication takes place locally or is external, each user identity must be represented in the Tableau Server identity store, which is managed by the Repository (Windows | Linux). The table below shows which authentication methods are compatible with which identity stores.

**Authentication method Local authentication AD/LDAP**

<table>
<thead>
<tr>
<th>Authentication method</th>
<th>Local</th>
<th>AD/LDAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAML</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Kerberos</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Mutual SSL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OpenID</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Trusted authentication</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Active Directory & OpenLDAP

In this scenario, Tableau Server must be installed in a domain in Active Directory. Tableau Server will sync user and group metadata from Active Directory to the identity store. You do not have to add users manually. However, after the data is synchronised, you will need to assign site and server roles. You can assign these individually or at the group level. Tableau Server does not synchronise any data back to Active Directory. Tableau Server manages content and server access according to the site role permission data stored in the Repository.

If you are already using Active Directory to manage users in your organisation, you must select Active Directory authentication during Tableau setup. For example, by synchronising Active Directory groups, you can set minimum site role Tableau permissions for users who are synchronised in the groups. You can synchronise specific Active Directory groups or all of them. For more information, see Synchronise all Active Directory groups on the server. Make sure to review User management in Active Directory deployments to understand how multiple domains, domain naming, NetBIOS and Active Directory user name format influence Tableau user management.

You can also configure Tableau Server to use LDAP as a generic way to communicate with the identity store. For example, OpenLDAP is one of several LDAP server implementations with a flexible schema. Tableau Server can be configured to query the OpenLDAP server. See Identity store. Authentication in this scenario may be provided by the native LDAP solution or with a single sign-on solution.

Active Directory/OpenLDAP authentication
SAML

SAML (Security Assertion Markup Language) is an XML standard that allows secure web domains to exchange user authentication and authorisation data. You can configure Tableau Server to use an external identity provider (IdP) to authenticate users over SAML 2.0. Tableau Server supports both service provider-initiated and IdP-initiated SAML in browsers only. Connections from Tableau Desktop or the Tableau Mobile app require that the SAML request be service provider-initiated. No user credentials are stored with Tableau Server, and using SAML enables you to add Tableau to your organisation’s single sign-on environment.

You can use SAML server-wide or you can configure sites individually. Here’s an overview of those options:

- Server-wide SAML authentication: A single SAML IdP application handles authentication for all Tableau Server users. Use this option if your server has only the Default site.

In addition, if you want to use site-specific SAML, you must configure server-wide SAML before you configure individual sites.

- Server-wide local authentication and site-specific SAML authentication: In a multi-site environment, users who are not enabled for SAML authentication at the site level can sign in using local authentication.

- Server-wide SAML authentication and site-specific SAML authentication: In a multi-site environment, all users authenticate through a SAML IdP configured at the site level, and you specify a server-wide default SAML IdP for users that belong to multiple sites.

User authentication through SAML does not apply to permissions and authorisation for Tableau Server content, such as data sources and workbooks. It also does not control access to underlying data that workbooks and data sources connect to. For more information, see SAML (Windows | Linux).
Trusted tickets

If you embed Tableau Server views into web pages, everyone who visits the page must be a licensed user on Tableau Server. When users visit the page, they are prompted to sign in to Tableau Server before they can see the view. If you already have a way of authenticating users on the web page or within your web application, you can avoid this prompt and save your users from having to sign in twice by setting up trusted authentication.

Trusted authentication simply means that you have set up a trusted relationship between Tableau Server and one or more web servers. When Tableau Server receives requests from these trusted web servers, it assumes that your web server has handled whatever authentication is necessary.

If your web server uses SSPI (Security Support Provider Interface), you do not need to set up trusted authentication. You can embed views and your users will have secure access to them as long as they are licensed Tableau Server users and members of your Active Directory (Windows | Linux).
Trusted tickets

**Mutual SSL**

Using mutual SSL, you can provide users of Tableau Desktop and other approved Tableau clients a secure, direct-access experience to Tableau Server. With mutual SSL, when a client with a valid SSL certificate connects to Tableau Server, Tableau Server confirms the existence of the client certificate and authenticates the user based on the username in the client certificate. If the client does not have a valid SSL certificate, Tableau Server can refuse the connection. You can also configure Tableau Server to fall back to username/password authentication if mutual SSL fails.

**Authorisation**

Authorisation refers to how and what users can access on Tableau Server after authentication has been verified. For more information, see *Governance in Tableau* on page 30.

Authorisation includes:

- What users are allowed to do with content hosted on Tableau Server, including projects, sites, workbooks and views.
- What users are allowed to do with the data sources that are managed by Tableau Server.
- What tasks users are allowed to perform to administer Tableau Server, such as configuring server settings, running command line tools, creating sites and other tasks.

Authorisation is managed by Tableau Server and determined by a combination of the user’s licence level (Tableau Creator, Tableau Explorer, Tableau Viewer), site role and permissions associated with specific entities such as workbooks and data sources. The project team should
work together to define the permissions model. Tableau Server and/or site administrators will assign permission rules to groups and lock them to the project. Custom permissions allow more granularity in permissions – from accessing or downloading a data source to how a user interacts with published content.

Tableau’s intuitive interface makes it easy to associate users to functional groups, assign permissions to the groups and see who has access to which content. You can create groups locally on the server or import from Active Directory and synchronise on a set schedule. The permissions view also helps business users manage their own users and groups. For more information, see Set up permissions quick start, Configure projects, groups and permissions for managed self-service, and Permissions reference.

Network communication

There are three main network interfaces in Tableau Server:

- Client to Tableau Server: The client can be a web browser, Tableau Mobile, Tableau Desktop, Tableau Prep Builder, or the TSM (Windows | Linux) or tabcmd (Windows | Linux) utilities.
- Tableau Server to your database(s): To refresh data extracts or handle live database connections, Tableau Server needs to communicate with your database(s).
- Server component communication: This applies to distributed deployments only.

You should configure SSL to ensure that access to Tableau Server is secure and that sensitive information passed between the server and Tableau clients is protected on your network. For more information, visit Network security (Windows | Linux) and Ports (Windows | Linux).

Network topologies

Users will be accessing Tableau from all over the place: their offices, on the road from their phones, from client sites in another country and more. To ensure the server is reachable no matter where the client is coming in from, you must determine the right network topology. Common network configurations are shown below:
On-premises with external VPN access

On-premises with reverse proxy

On-premises with external VPN access

On-premises with reverse proxy
Public cloud deployment

Data strategy

Every organisation has different requirements and solutions for its data infrastructure. Tableau respects an organisation’s choice and integrates with your existing data strategy. In addition to the enterprise data warehouse, there are many new sources of data appearing inside and outside of your organisation: cloud applications and data, big data databases, structured and unstructured Repositories. From Hadoop clusters to NoSQL databases, and many others, the data flow no longer needs to be centralised around the enterprise data warehouse (EDW) as a final destination.

Modern data architecture is driven by new business requirements (speed, agility, volume) and new technology. You choose whether to provide access to the data in place or enrich data with other sources. Combine this with cloud solutions that allow for infrastructure and services to spin up data pipelines in hours, and what you have is a process for moving data around an organisation like never before. Unfortunately, the new opportunity is largely missed if your organisation’s data management handbook was written using a traditional EDW’s single bucket of data mindset. The trick to shifting from buckets to pipelines is accepting that not all data questions within an organisation can be answered from any one data source. The pattern for a modern data architecture is shown below.
Modern data architecture

1. Raw data: sources of data; for example, transactional data that is loaded into the data platform that often needs transforming in several ways: cleansing, inspection for PII, etc.
2. Compute for prep: processing the raw data can require significant computational resources, so it's more than traditional ETL. Data science apps will often sit here. They actually can create new data with high value.
3. Storage: modern data platforms are built on a principle of storing data because you never know how it might be used in the future. Increasingly, we store intermediate data, and multiple versions and forms of the same data. Storage is therefore layered.
4. Compute for query: the typical analytical database engine, including Hyper extracts, but also Hadoop, etc.
5. Analytics: Tableau sits in Analytics.

Tableau’s hybrid data architecture

Tableau’s hybrid data architecture provides two modes for interacting with data, using a live connection or an in-memory extract. Switching between the two is as easy as selecting the right option for your use case.

Live connection

Tableau’s data connectors leverage your existing data infrastructure by sending dynamic queries directly to the source database rather than importing all the data. This means that if you’ve invested in fast, analytics-optimised databases, you can gain the benefits of that investment by connecting to your data live. This leaves the detail data in the source system and sends the aggregate results of queries to Tableau. Additionally, this means that Tableau
can effectively utilise unlimited amounts of data. In fact, Tableau is the front-end analytics client to many of the largest databases in the world. Tableau has optimised each connector to take advantage of the unique characteristics of each data source.

In-memory extract

If you have a data architecture built on transactional databases or want to reduce the workload of the core data infrastructure, Tableau’s Data Engine powered by Hyper technology provides an in-memory data store that is optimised for analytics. You can connect and extract your data to bring it in-memory to perform queries in Tableau with one click. Using Tableau data extracts can greatly improve the user experience by reducing the time it takes to re-query the database. In turn, extracts free up the database server from redundant query traffic.

Extracts are a great solution for highly active transactional systems that cannot afford the resources for frequent queries. The extract can be refreshed nightly and available to users during the day. Extracts can also be subsets of data based on a fixed number of records, a percentage of total records or filtered criteria. The Data Engine can even do incremental extracts that update existing extracts with new data. Extracts are not intended to replace your database, so size the extract to the analysis at hand.

If you need to share your workbooks with users who do not have direct access to the underlying data sources, you can use extracts. Tableau’s packaged workbooks (.twbx file type) contain all the analysis and data that was used for the workbook, making it both portable and shareable with other Tableau users.

If a user publishes a workbook using an extract, that extract is also published to the server. Future interaction with the workbook will use the extract instead of requesting live data. If enabled, the workbook can be set to request an automatic refresh of the extract on a schedule.

Query federation

When related data is stored in tables across different databases or files, you can use a cross-database join to combine the tables. To create a cross-database join, you create a multi-connection Tableau data source by adding and then connecting to each of the different databases (including Excel and text files) before you join the tables. Cross-database joins can be used with live connections or in-memory extracts.
Data Server

Included with Tableau Server, Data Server provides sharing and centralised management of extracts and shared proxy database connections, allowing IT to make governed, measured and managed data sources available to all users of Tableau Server without duplicating extracts or data connections across workbooks.

Because multiple workbooks can connect to one data source, you can minimise the proliferation of embedded data sources and save on storage space and processing time. When someone downloads a workbook that connects to a published data source that in turn has an extract connection, the extract stays on the server, reducing network traffic. Finally, if a connection requires a database driver, you need to install and maintain the driver only on the server, instead of on each user’s computer.

Using the initial data use cases collected from each team, a DBA and/or data steward will publish a certified data source for each source of data identified for users with the appropriate permissions to access it. Users can connect directly to a published data source from Tableau Desktop and Tableau Server.

Published data sources prevent the proliferation of data silos and untrusted data for both extract and live connections. Extract refreshes can be scheduled, and users across the organisation will stay up to date with the same shared data and definitions. A published data source can be configured to connect directly to live data with a proxy database connection. This means your organisation has a way to centrally manage data connections, join logic, metadata and calculated fields.

At the same time, to enable self-service and flexibility, users can extend the data model by blending in new data or creating new calculations and allow the newly defined data model to be delivered to production in an agile manner. The centrally managed data will not change, but users retain flexibility.

Certified data sources

Database administrators and/or data stewards should certify published data sources to indicate to users that the data is trusted. Certified data sources appear with a unique certification badge in both Tableau Server and Tableau Desktop. Certification notes allow you to describe why a particular data source can be trusted. These notes are accessible throughout Tableau when viewing this data source as well as who certified it. Certified data sources receive preferential treatment in search results and stand out in data source lists in Tableau Server and Tableau Desktop. Project leaders, site admins and Tableau Server
Tableau Blueprint help

administrators have permission to certify data sources. For more information, visit Certified data sources.

Data security

Data security is of utmost importance in every enterprise. Tableau allows customers to build upon their existing data security implementations. IT administrators have the flexibility to implement security within the database with database authentication, within Tableau with permissions or a hybrid approach of both. Security will be enforced regardless of whether users are accessing the data from published views on the web, on mobile devices, or through Tableau Desktop and Tableau Prep Builder. Customers often favour the hybrid approach for its flexibility to handle different kinds of use cases. Start by establishing a data security classification to define the different types of data and levels of sensitivity that exist in your organisation.

When leveraging database security, it is important to note that the method chosen for authentication to the database is key. This level of authentication is separate from the Tableau Server authentication (i.e. when a user logs into Tableau Server, they are not yet logging into the database). This means that Tableau Server users will also need to have credentials (their own username/password or service account username/password) to connect to the database for the database-level security to apply. To further protect your data, Tableau only needs read-access credentials to the database, which prevents publishers from accidentally changing the underlying data. Alternatively, in some cases, it is useful to give the database user permission to create temporary tables. This can have both performance and security advantages because the temporary data is stored in the database rather than in Tableau.

Extract encryption at rest is a data security feature that allows you to encrypt .hyper extracts while they are stored on Tableau Server. Tableau Server administrators can enforce encryption of all extracts on their site or allow users to specify to encrypt all extracts associated with particular published workbooks or data sources. For more information, see Extract encryption at rest. If your organization is deploying data extract encryption at rest, then you may optionally configure Tableau Server to use AWS as the KMS for extract encryption. To enable AWS KMS, you must deploy Tableau Server in AWS EC2. In the AWS scenario, Tableau Server uses the AWS KMS customer master key (CMK) to generate an AWS data key. Tableau Server uses the AWS data key as the root master key for all encrypted extracts. However, even when configured for AWS KMS, the native Java keystore and local KMS are still used for secure storage of secrets on Tableau Server. The AWS KMS is only used to encrypt the root master key for encrypted extracts. For more information, see Key management system.
You can limit which users see what data by setting user filters on data sources. This allows you to better control what data users see in a published view based on their Tableau Server login account. Using this technique, a regional manager is able to view data for her region but not the data for the other regional managers. With these data security approaches, you can publish a single view or dashboard in a way that provides secure, personalised data and analysis to a wide range of users on Tableau Server. For more information, see Data security and Restrict access at the data row level.

### Tableau Server add-ons

#### Tableau Data Management Add-on

The Tableau Data Management Add-on helps you better manage the data within your analytics environment, ensuring that trusted and up-to-date data is always used to drive decisions. From data preparation to cataloguing, search and governance, the Data Management Add-on will increase trust in your data, accelerating the adoption of self-service analytics. It is a separately licensed collection of features and functionality including Tableau Prep Conductor and Tableau Catalog, which manage Tableau content and data assets.

Tableau Prep Conductor is included in the Data Management Add-on as of Tableau Server 2019.1. Tableau Prep Conductor runs flows, checks connection credentials and sends alerts if a flow fails. Tableau Prep Conductor leverages the scheduling and tracking functionality of Tableau Server so you can automate running flows to update the flow output instead of logging into Tableau Prep Builder to manually run individual flows as your data changes. It is recommended that you enable Tableau Prep Conductor on a dedicated node to run flows. For new Tableau Server installations, see Installing Tableau Server with Prep Conductor. To enable Tableau Prep Conductor on an existing installation of Tableau Server, see Enable Tableau Prep Conductor on your Tableau Server installation.

Starting in 2019.3, Tableau Catalog is also included in the Data Management Add-on for Tableau Server. Tableau Catalog integrates with Tableau applications to provide lineage, impact analysis, data dictionary, data quality warnings and enhanced search by indexing all content, including workbooks, data sources, sheets and flows. To enable Tableau Catalog on Tableau Server, see Enable Tableau Catalog.
Tableau Server Management Add-on

Tableau Server Management Add-on is a separately licensed add-on to Tableau Server which will provide enhanced security, manageability and scalability capabilities for Tableau Server. To learn more about what is included, as well as specific installation and configuration requirements for each, see the following topics:

- Resource Monitoring Tool
- Content Migration Tool
- Key management system
- Tableau Server external repository
- Workload management through node roles

External services

Tableau supports a set of functions that you can use to pass expressions to external services for integration with R, MATLAB and Python. Combining advanced statistical analytics with Tableau gives you the ability to enable users of all skill levels to reap the benefits without deep knowledge of the underlying statistical packages and functions. Additional configuration in Tableau Server is needed to enable external advanced analytics functionality.

Extensibility

Tableau supports a robust extensibility framework for deep and complex enterprise integration and embedded analytics solutions. Extensibility spans from administrative task automation to rich visualisation integration and enterprise portal applications, bringing any data from any source into a Tableau-supported format and delivering server automation with a growing set of standards-based APIs. For more information, see IT tools and Tableau developer programme.

REST API

With the Tableau Server REST API you can create, read, update, delete and manage Tableau Server entities programmatically via HTTP. The API gives you simple access to the functionality behind the data sources, projects, workbooks, site users and sites on a Tableau Server. You can use this access to create your own custom applications or to script interactions with Tableau Server resources.
Extract API

Tableau provides direct support and connection to a large number of data sources; however, there are times when you may want to pre-process or access and assemble data from other applications before working with it in Tableau. With Tableau’s Extract API, developers can write their own programs to access and process those data sources into a Tableau data extract. Use Extract API 2.0 for .hyper format and Tableau SDK for .tde format. The extract can be used natively in Tableau Desktop or published to Tableau Server using the same API. Once the extract has been published to Tableau Server, it is available for an individual to use with the web authoring capability or in Tableau Desktop. The API works with C/C++, Java and Python. The Extract API is available for developers on Windows and Linux platforms.

Web data connector

You can use the Tableau Web Data Connector SDK to build connectors to additional data sources with Javascript and HTML. Web data connectors (WDCs) are web pages that provide a data connection that is accessible over HTTP for data sources that don’t already have a connector in Tableau. WDCs allow users to connect to almost any data that is accessible over the web and to create extracts for their workbooks. Data sources for a WDC can include internal web services, JSON data, REST APIs and other sources that are available over HTTP or HTTPS. Users can create their own WDC or use connectors that were created by others. To publish to Tableau Server, WDCs will need to be whitelisted (Windows | Linux). For more information on community connectors, see Web data connector forum.

JavaScript API

With Tableau’s JavaScript API, you can fully integrate Tableau visualisations into your own web applications. The API uses an event-based architecture, providing you with flexibility for round-trip control of users’ actions in Tableau visualisations and control of your users’ interactions. For example, your enterprise may have a web portal that bridges several lines of business applications as well as dashboards. To make it easier for users, you may prefer to have a consistent UI across all applications. With the JavaScript API, you can create buttons and other controls in your preferred style that control elements of a Tableau dashboard.
Extensions API

With Tableau’s Extensions API, developers can create dashboard extensions that enable customers to integrate and interact with data from other applications directly from a Tableau dashboard, such as write-back functionality, custom interactive interfaces and third-party product integration. Dashboard extensions run in custom dashboard zones and can interact with the rest of the dashboard using the Tableau Extensions API. Available third-party extensions have been published in the extension gallery. To publish to Tableau Server, extensions will need to be whitelisted (Windows | Linux). Administrators can enable extensions on a per-server or per-site basis based on code review and security assessment.

Document API

The Document API provides a supported path for modifying Tableau workbook and data source XML. Using Python, you can create a template workbook in Tableau and easily deploy it across multiple servers, update data sources and connections, and evaluate fields within a data source.

TSM API

Tableau Server includes a set of administrative services called Tableau Services Manager (TSM). This set of documentation describes the prerelease TSM API (0.5 alpha), which you can use to perform a wide range of tasks, including starting and stopping Tableau Server, viewing the status of services and nodes, backing up and restoring Tableau Server, making configuration and topology changes, changing port assignments for services and creating log file archives.

Metadata API

Tables, data sources, workbooks and sheets are available to query via the Tableau Metadata API. The API is fast and flexible and includes common attributes like name, hostname and URI, as well as type-specific information like field data types and certification. The API will also allow you to query for connected items (e.g. tables and columns used by a specific data source). In addition to the Metadata API, metadata methods are available in the Tableau REST API, which can be found in the Metadata methods topic.
Mobile App Bootstrap

Develop custom mobile apps with the Mobile App Bootstrap (MAB). The MAB is a sample open-source mobile app that demonstrates how to connect and stay signed in to Tableau Servers, embed Tableau content and utilise the Tableau JavaScript API to embed the Tableau content you want to have right at your fingertips. For more information, visit Mobile App Bootstrap – React native, Mobile App Bootstrap – Cordova or Mobile App Bootstrap – Objective-C.

Client software

Administrators will distribute and install Tableau Desktop and Tableau Prep Builder for Creator-licensed users. If you choose to create a packaged installation file, you can customise the installation and not have any prompts for the end user during the install process. When you install Tableau Desktop or Tableau Prep Builder on a Windows or Mac computer, default database connectivity drivers are installed. For a complete list of default drivers, see Before you install. If you prefer that some or all of these drivers not be installed, you can customise the list from the Customise pane in the installation program for Tableau Desktop. If additional drivers are needed beyond the default, they will need to be installed on each computer.

Virtual desktop support is an “opt-in” feature of Tableau Desktop 10.5 and later and Tableau Prep Builder 2018.2.1 and later that gives you the ability to optimise your installations of Tableau for non-persistent virtual desktops or for computers that are regularly re-imaged. With virtual desktop support enabled, Tableau licences are automatically deactivated after a predetermined amount of time if Tableau Desktop or Tableau Prep Builder cannot connect to a Tableau-hosted service that confirms the validity of the licence. This means that you do not need to manually refresh or deactivate the product key. The requirement that Tableau communicate with the hosted service means that you must periodically connect to the Internet. For more information, see Configure virtual desktop support.

It is recommended to enable a feature where Tableau Desktop licences log end user information within your Tableau Server Repository. Each copy of Tableau Desktop version 10.0 or later can be configured to send user data to Tableau Server. This configuration should be done at installation time, using scripting or third-party software to install and configure Tableau, or after installation by modifying the registry or property list file. For more information, see Configure Desktop licence reporting and continue the server configuration as outlined in the Licence tracking section.
To manage Tableau mobile deployments, we recommend using mobile device management (MDM) or mobile application management (MAM). The following mobile management systems are supported: Blackberry Dynamics, VMware Workspace ONE, MobileIron, Citrix XenMobile and Microsoft Intune. Users will see touch-optimised views on Apple iPad and iPhone, Android phones and tablets, as well as mobile browsers. For more information, visit Tableau Mobile deployment guide.

**Tableau support programmes**

Tableau Software offers three support levels to help meet the service needs of all customers.

- **Standard support** is included with a subscription purchase, the first year of a perpetual licence or with annual maintenance renewal after the first year of a perpetual licence.
- **Extended support** enables your organisation to avoid or reduce downtime and expedite the value of your investment through accelerated response times and the additional availability of 24/7 weekend support for critical P1 issues.
- **Premium support** provides complete, proactive account care you can rely on. Premium support provides a comprehensive set of resources, extended availability and the fastest response time to service issues with 24/7 support for P1 and P2 issues.

For more information, see Technical support programme levels.
Tableau monitoring

Ongoing, proactive monitoring is required to operate and support your deployment at scale and meet the performance expectations of your user community. As more and more users are onboarded and the use of analytics grows across your organisation, Tableau becomes mission-critical for data-driven decisions. Without monitoring, a “set-it-and-forget-it” deployment can be met with inadequate resources that fail to support the workload of highly engaged users.

Because Tableau is integrated with your enterprise architecture – including hardware, network, databases and applications – understanding how everything inter-operates is key for routine monitoring from performance to troubleshooting. Licensed as part of the Tableau Server Management Add-on, the Resource Monitoring Tool, using agent-based monitoring, offers enhanced insights into the health and performance of a Tableau Server cluster by parsing and analysing the logs generated by overall server usage and combining that with monitoring of physical system usage (CPU usage, RAM, disk I/O etc.). Alternatively, you can use a combination of hardware utilisation monitoring, data from Tableau Server’s Repository, and external tools to understand and monitor the health of Tableau Server and how analytics are being consumed. You can use standard enterprise monitoring platforms, such as Splunk, New Relic or other agent-based utilities, as well as Tableau Desktop to analyse your Tableau Server data.

Tableau Server and site administrators will work together to ensure the performance and stability of the platform to meet evolving business needs. It is just as important to monitor for things that go right as it is for things that go wrong. With viral adoption of Tableau in your organisation, you will need to be responsive to the increased workloads and proactively scale to avoid resource constraints. On the other hand, assuming a correctly sized hardware configuration is deployed initially, unmonitored hardware utilisation and user workloads, inefficient workbooks, suboptimal data extract design and peak-hour data refresh schedules can have a major impact on server performance and user experience, causing performance to degrade from the cumulative effect of the separate incidents.

This document defines the required tasks for Tableau Server monitoring and operations that should be performed by systems administrators and Tableau Server administrators:

- Set up tools to monitor hardware utilisation and maintain sufficient headroom for future growth and peak usage spikes.
- Configure built-in alerts and incidents to notify you of events and thresholds.
- Use default administrative views to identify background task success/failure and job queueing, slow workbooks, disk usage and licence allocations.
- Create custom administrative views from repository data for deeper analytics on your deployment and custom data-driven alerts for your own organisation’s policies and goals.
- Troubleshoot problems with Tableau Server logs.

Administrative roles and responsibilities

Depending on the size of the organisation and deployment, monitoring and measurement responsibilities may be split across different teams. For example, a systems administrator may be responsible for the hardware and operating system only, while Tableau Server administrators will monitor and track key application metrics, and site administrators will measure content metrics in their respective site(s). Both are equally important for overall success.

If there are no site administrators, content metrics should be monitored and measured by the server administrator. For more information on content metrics, see Measurement of Tableau user engagement and adoption on page 127. Regardless of the deployment size, system performance is a shared responsibility among administrators and users.

Hardware monitoring

Any application is only as reliable and performant as the hardware that it runs on. It is important that the underlying infrastructure of your Tableau Server deployment be routinely monitored for capacity constraints to prevent overtaxing the system, whether it’s physical servers or virtual machines, on-premises or in the cloud. System administrators should monitor CPU, memory usage, storage I/O, storage space and network bandwidth utilisation.

Beginning with 2019.3 and licensed as part of the Tableau Server Management Add-on, the Resource Monitoring Tool provides a comprehensive look at the health of Tableau Server using a web user interface for all of its features. The Resource Monitoring Tools Agent runs on each of the nodes in your Tableau cluster to monitor their hardware utilisation, performance and activity, which are collated by the Resource Monitoring Tool Master Server. Processor, memory, disk queue and network are sampled using WMI several times per second to produce averages. An environment-down event, which is logged as critical, is monitored at a 15-second polling interval by default and follows a three-strike rule. If the status is offline, or does not reply within 30 seconds, for three consecutive polling intervals then a critical incident is created. For more information, see Performance and Environment down.
BEST PRACTICE RECOMMENDATION:

To maintain sufficient headroom and reduce the likelihood of resource constraints, calculate the following values based on your hardware specs and set Resource Monitoring Tool hardware incident thresholds to the following:

- CPU over 80% for 5 minutes
- Memory less than 25% available
- Disk less than 20% available

Depending on your enterprise monitoring approach, hardware monitoring can be done with an agent-based enterprise monitoring service or with PerfMon on Windows (sample workbook). Linux admins will use the sysstat tools or vmstat to collect data to be analysed in a workbook similar to the Windows version. When deploying on virtual platforms, such as VMware, HyperV or Citrix, or in the public cloud, including AWS (CloudWatch), Microsoft Azure (Azure Portal) and Google Cloud Platform (Google Stackdriver), these platforms have their own utilities for monitoring the health of their virtual machines. These tools usually have support for automatically monitoring your infrastructure and alerting you when your preset thresholds of 75-85% utilisation are exceeded.

Alternatively, TabMon is a freely available open source Tableau Server cluster-monitoring tool. TabMon provides structured output that is analysed with Tableau Desktop. For more information, watch a tour of the TabMon sample workbook that shows how to monitor CPU, memory usage, storage I/O, storage space and network bandwidth at the Tableau Server process level. This information will help you understand when to scale Tableau Server. In the TabMon.config file, you should monitor every 300 seconds and keep data for 30-day intervals to manage the size of the database.
**Built-in alerts**

If Tableau Server processes go down, the application state will be degraded or even fail depending on the process that goes down. During installation and configuration, Tableau Server was configured with an SMTP email server to notify the specified email distribution list about system alerts and failures. With system alerts enabled, you will be notified by email of process up, down and failover events, as well as drive space constraints. See below for recommended settings.

![Image of built-in alerts settings](image)

**BEST PRACTICE RECOMMENDATION:**

Enable system health monitoring in Tableau Services Manager for process up, down and failover events, licence reporting and disk space. Use an email distribution group for administrators rather than an individual’s email address for notifications. If you are using the Resource Monitoring Tool, keep thresholds synchronised.
Resource Monitoring Tool incidents

Beginning with 2019.3 and licensed as part of the Tableau Server Management Add-on, the Resource Monitoring Tool provides a comprehensive look at the health of Tableau Server using a web user interface for all of its features. The Resource Monitoring Tools Agent runs on each of the nodes in your Tableau cluster to monitor their performance and activity, which are collated by the Resource Monitoring Tool Master Server.

Incidents should be configured and used to help detect when unusual situations occur, which include a variety of events for both Tableau Server and the server it is running on. Global incidents can be configured, but they may be overridden per environment. There are three levels of incidents: Info, Warning, and Critical. For more information, see Tableau Resource Monitoring Tool – Incidents.

In addition to Hardware and Environment down, which are described in Hardware monitoring, incidents will be logged for the following reasons:

- **Extract failures** – Logged as a warning when there is an extract failure in Tableau.
- **Slow queries** – Logged if a query exceeds the threshold. By default, a slow query incident will trigger a warning if any data query takes at least 30 seconds to execute.
- **Slow view** – Logged if a view request exceeds the threshold. By default, a slow view incident will trigger a warning if any view request takes at least 1 minute to load.
- **Agents unlicensed** – Logged as critical if Tableau Server has not been properly licensed to use the Tableau Resource Monitoring Tool.

Tableau Server process status

When Tableau Server is functioning properly, most processes will show as active, busy or passive (repository). The list below shows possible process states:

- **Active** – The process is functioning as intended. See File store in Troubleshoot Server processes for details on possible active states.
- **Busy** – The process is completing a task of some kind. See File store and Repository in Troubleshoot Server processes for more information.
- Passive – The repository is in passive mode.
- Unlicensed – The process is unlicensed.
- Down – The process is down. The implications of this differ depending on the process.
- Status unavailable – Tableau Server is unable to determine the status of the process.

To find the status of processes, go to the Tableau Server status page or Tableau Services Manager status page. These pages include Tableau Server processes, along with links to troubleshooting documentation if a process is not running as expected. If you hover your mouse pointer over the status indicator for a process, a tooltip shows the node name and the port the process is running on.

Beginning with 2019.3 and licensed as part of the Tableau Server Management Add-on, the Resource Monitoring Tool provides a comprehensive look at the health of Tableau Server using a web user interface for all of its features, including process status. The Resource Monitoring Tool polls Tableau Server’s http://{TableauServerUrl}/admin/systeminfo.xml page every 15 seconds (by default) to check the status. If the status is offline, or does not reply within 30 seconds, for three consecutive polling intervals then a critical incident is created. For more information, see Environment down.

To integrate with external enterprise monitoring tools, use the TSM REST API to get the status of each process.
BEST PRACTICE RECOMMENDATION:

In case of an error, review Troubleshoot Server processes in the online help, and take a log snapshot if you need to contact Tableau Support for further assistance.

Administrative views

Data from the Tableau Server repository will be analysed using default administrative views and custom administrative views. Administrative views are dashboards that are included with Tableau Server and help you understand how users are interacting with content so that you can proactively monitor server activity and other scheduled tasks. Server administrators can view administrative views for all server activity; site administrators have access to Tableau Server’s default administrative views limited to their respective site.

BEST PRACTICE RECOMMENDATION:

Regularly spend time investigating Tableau Server usage patterns and how the application is performing throughout the day. Keep a close watch on background tasks, such as extract refreshes and subscriptions, to make sure they are executing on time and during off-peak hours as much as possible. For heavy extract workloads, it is recommended to isolate the backgrounder processes to their own node.

Brief descriptions of the default administrative views that are most applicable to server administrators are shown below:

- **Background tasks for extracts** – Completed, pending and failed extract task details with full details of why an error occurred.
- **Background tasks for non-extracts** – Completed, pending and failed non-extract background task details with full details on why an error occurred.
- **Background task delays** – Difference between scheduled and actual start times of background tasks. Use the view to help you identify places where you can improve server performance by redistributing task schedules and optimising tasks. Background task delays are an important metric to determine whether you should isolate backgrounder processes and scale out to add additional capacity for data refreshes.
- **Stats for load times** – View load times and performance history. Set data-driven alerts on long view load times using the version of the default admin views workbook you downloaded and published with extracted data sources. For workbooks with long load times, use
Tableau Desktop’s or Tableau Server’s Performance Recorder to dive deeper into the events and timing.

- **Stats for space usage** – Space used by published workbooks and data sources, including extracts and live connections. Set data-driven alerts on the Stats for space usage view to identify which workbooks and data sources exceed the expected size limit. For example, if you set a standard that extract sizes should be less than 1 GB, then alert for anything larger.

- **Performance of views** – Overall distribution of view load times and slowest views in a given time period. Compare spikes in the number of sessions with spikes in slow load times to identify the times of day when high user traffic is slowing down the server.

- **Performance of flow runs** – See the performance history for all the flows on a site

- **Server disk space** – Current and historical disk space usage by server node. Use the server disk space view to see how much disk space is in use on the server(s) that run Tableau Server, where disk space refers only to the partition where Tableau Server is installed. You can also use this view to identify sudden changes in disk space usage.

- **Tableau Desktop licence usage** – Summary of usage for Tableau Desktop licences. Manage licences efficiently and determine if you need more or fewer licences.

- **Tableau Desktop licence expiration** – Expiration information for Tableau Desktop licences.

The following default administrative views will be monitored primarily by site administrators, which are covered in *Measurement of Tableau user engagement and adoption* on page 127

- **Traffic to views** – Usage and users for published views.

- **Traffic to data sources** – Usage and users for published data sources.

- **Actions by all users** – Actions for all users.

- **Actions by specific user** – Actions for a specific user, including items used.

- **Actions by recent users** – Recent actions by users, including last action time and idle time.

Custom administrative views are useful for deeper analysis of user behaviour and organisation-specific KPIs that are identified. For example, if you define stale content as workbooks that have not been accessed in the last 90 days, you should create a custom administrative view showing the content that has not been accessed in the last 90 days. If these workbooks have data extract refresh schedules, they are consuming system resources but not providing value to your users.

**BEST PRACTICE RECOMMENDATION:**
Tableau Blueprint help

You should publish and extract the default administrative views workbook to make it accessible to site administrators. After opening the administrative views in Tableau Server, you can copy the temporary workbook to your computer, open it in Tableau Desktop and publish it to Tableau Server for others to view. In Tableau Server 10.x to 2018.1, the location is “Tableau Server\data\tabsvc\temp”. In 2018.2 and later, it can be under any VizQL server process. For example: Tableau Server\data\tabsvc\temp\vizqlserver_1.20182.18.0627.2230.

In the published admin views workbook, create data-driven alerts for stats for load times and stats for space usage according to your governing standards. For example, if you have a < 10 second load time standard, the data-driven alert will notify you of load times < 10 seconds. Similarly, if you have a 1 GB standard for workbook or data source size, the data-driven alert will notify you of workbooks or data sources > 1 GB.

For custom administrative views, you should use the default administrative views workbook as a starting point for customising existing dashboards and published/extracted community data sources to perform deeper analysis on your deployment. A full listing of the repository’s data dictionary is published in the online help system.

Both the default administrative views workbook and the community data sources have curated data models that can be connected to your own Tableau Server. Each of the community data sources contains the corresponding fields for their functional area with comments, and they’re organised into folders. Sample workbooks are also provided in the community post. The list of recommended published data sources is shown below:

- TS background tasks – Primarily for analysing extract refresh and subscription tasks that are run on backgrounder processes.
- TS events – A master audit data source showing events happening on Tableau Server. Users signing in, accessing views, publishing content, etc.
- TS web requests – An audit of requests made through the Tableau Server web server component. Useful for understanding user interaction with content, as well as performance monitoring.
- TS data connections – Maps both workbooks and published data sources to their underlying data connections. Useful for answering questions about what workbooks connect to what data source, which then connects to what database(s)?
- TS content – High-level, summarised data for each view, workbook and published data source on Tableau Server.
- TS users – Aggregated information on what your users are up to on Tableau Server.
Troubleshooting

For troubleshooting (Windows | Linux), and more detailed analysis of server processes, use Tableau Server logs. If you need to open a support case, you will need to submit the log files. Tableau Support will use log files to diagnose issues. To generate a log file snapshot and upload to Tableau Support, follow these instructions (Windows | Linux).

Beginning with 2019.3 and licensed as part of the Tableau Server Management Add-on, the Resource Monitoring Tool provides a comprehensive look at the health of Tableau Server using a web user interface for all of its features. The Resource Monitoring Tools Agent runs on each of the nodes in your Tableau cluster to monitor their hardware utilisation, performance and activity, which are collated by the Resource Monitoring Tool Master Server. This includes Tableau log files in near real time and sending messages to the master server for processing and reporting, logging slow views for specific users, and tracing down to the session level.

Alternatively, Logshark, a free open-source tool, is a command-line utility that you run against Tableau Server logs to generate a set of workbooks that provide insights into system performance, content usage and error conditions. You should use Logshark to visualise, investigate and solve issues with Tableau. Some common use cases for Logshark include:

- Troubleshooting issue(s) that are recorded in the logs
- Analysing system metrics from log data
- Regularly validating Tableau Server application behaviour against historical data when taking a new build or making a system change

BEST PRACTICE RECOMMENDATION:

Logshark uses the entire set of Tableau ZIP log files that you generate. It can be either just one day or several days of logs. There are many Logshark plugins, which will correspond to a set of log files, to generate pre-built Tableau workbooks automatically.

For viewing individual log files (Windows | Linux), Tableau Log Viewer is cross-platform, free open-source tool with a simple interface that displays Tableau log files in a columnar layout.
Tableau maintenance

As the use of analytics grows across your organisation, Tableau will become mission-critical for data-driven business decisions. Regular maintenance activities will keep your Tableau deployment running in top condition. You will operationalise change management processes to support the increased use of analytics, including performance tuning, load testing, capacity planning and upgrades.

Monitoring data will be the driver behind many maintenance decisions. Administrators will check the status of the server, analyse and monitor server activity, manage scheduled tasks and perform other maintenance activities. This document outlines the maintenance activities outlined in the table below:

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>With</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Directory synchronisation</td>
<td>Synchronises Active Directory groups</td>
<td>Tableau Server settings</td>
<td>Daily</td>
</tr>
<tr>
<td>Backup production environment</td>
<td>Creates a copy of content and settings in location outside of the Tableau Server cluster, retained for seven days</td>
<td>TSM CLI</td>
<td>Daily</td>
</tr>
<tr>
<td>Restore production to test environment</td>
<td>Puts test environment in current state of production environment</td>
<td>TSM CLI</td>
<td>Prior to load testing, testing an upgrade or participation in beta programme</td>
</tr>
<tr>
<td>Database maintenance / log file cleanup</td>
<td>Remove and archive Tableau Server log files, temporary files and rows from the table http_requests in the Tableau Server PostgreSQL database</td>
<td>TSM CLI</td>
<td>Monthly</td>
</tr>
<tr>
<td>Load testing / capacity planning</td>
<td>Understand your Tableau Server’s capacity with respect to your environment, data, workload and usage profile</td>
<td>TabJolt (Windows only)</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>With</td>
<td>Frequency</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------</td>
<td>---------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Resource management</td>
<td>Archive stale content that has not been accessed in 180 days</td>
<td>Custom admin view</td>
<td>Two to four times per year prior to upgrade</td>
</tr>
<tr>
<td>Upgrades</td>
<td>Process to evaluate new releases and plan/execute the upgrade</td>
<td>TSM CLI</td>
<td>Agreed-upon schedule among sponsors and project team</td>
</tr>
</tbody>
</table>

### Active Directory synchronisation

If you are using Active Directory authentication, you should synchronise all Active Directory groups on a regular schedule using the General tab of the Settings page for the server. If you run Tableau Server on Linux, external directory communication is configured and managed with an LDAP identity store. In the context of user and group synchronisation, Tableau Server configured with an LDAP identity store is equivalent to Active Directory. Active Directory synchronisation features in Tableau Server function seamlessly with properly configured LDAP directory solutions ([Windows](https://docs.microsoft.com/en-us/windowsservers/)| [Linux](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_RHEL/7/html/Management_Guide/ldap thwarting)).

### Backup and restore

A Tableau Server administrator should perform daily backups of Tableau Server and its data. Taking these steps can help ensure that Tableau Server runs with minimum loss. You will use the Tableau Services Manager (TSM) command line tool to back up and restore Tableau data, including Tableau Server’s own PostgreSQL database, which stores workbook and user metadata, data extract files, server configuration data and log files ([Windows](https://docs.microsoft.com/en-us/tableau/server/technical-reference/)| [Linux](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_RHEL/7/html/)). As of 2018.2, both Windows and Linux versions of Tableau Server use TSM. For Tableau Server on Windows 2018.1 and earlier, you will use `tabadmin backup`.

### Database maintenance

Database maintenance creates free space on the Tableau deployment by deleting old files, including log files, temp files and rows from the `http_requests` table. If you are running Tableau
Server on a distributed deployment, run this command on the node that is running the TSM Controller process. By default, the controller is on the initial node in the cluster (Windows | Linux).

Note: If you need historical data in http_requests for audit analysis, ETL the data from the http_requests table to another database prior to executing the cleanup commands. If cleanup commands are part of your backup script, data in the http_requests table is truncated.

Load testing

Load testing helps you understand your Tableau Server’s capacity with respect to your unique environment, data, workload and usage profile. Because data, workload and usage will change as new content is authored, new users are onboarded and the use of analytics increases, load testing should be conducted two to four times a year in conjunction with upgrades and server scale-up or scale-out expansions.

Created by Tableau, TabJolt is a point-and-run load- and performance-testing utility specifically designed for Tableau Server. It helps you understand how Tableau Server scales with increasing workloads to inform your capacity needs. TabJolt automates user-specified loads for any duration, while eliminating the need for script development and script maintenance, which is often required with other load-testing solutions. With increasing user loads, Tableau Server scales nearly linearly with load by adding more nodes to the cluster for Windows and Linux.

Load-testing best practices are listed below:

- Load testing should be conducted with TabJolt on an identical test environment with content restored from the production environment. This is not only from a hardware and Tableau Server topology perspective but also in terms of data volume.
- Select representative content from your top-viewed workbooks. Often the cause of scalability and performance issues can be workbooks being not authored with best practices in mind. If a single-user test on your workbooks shows a very slow response time, then you should optimise those workbooks before you begin a load-testing project.
- During testing, increase the workload to 75-85% CPU utilisation and < 2% error rate.
- Start with the default process configuration determined by Tableau Server’s architecture-aware installer and scale up or out as needed when the threshold is met and sustained.
- In most cases, increasing process counts above the defaults does not improve performance, unless enough hardware resources are available.
• It is always good to know the breaking point of the server in terms of how many users/requests and how much data it can handle.

Developing a test plan:

• Choose representative workbooks.
• Model the expected usage.
• Think about peak usage.
• Run for at least ten minutes.
• Include thinking time.
• Stop other work on the server.

Capacity planning

To ensure optimal performance and sufficient capacity to handle increased workloads, you must plan for growth. Capacity planning allows you to scale your infrastructure with the increased use of analytics and rapid adoption across your organisation by ensuring sufficient headroom is maintained and reducing the likelihood of resource contention or conflicts over shared resources. Performance data, user onboarding schedules and load testing results are used to determine future server sizing and the capacity plan.

Factors that can influence capacity planning:

• A newly released set of data sources coupled with a dashboard that draws the attention of the entire company.
• Increasing skills and use of analytics that become ingrained in the day-to-day operations of the company.
• New features released for the platform, which can increase user interactivity overall.
• A change in the underlying data strategy powering these dashboards, whether in terms of volume, complexity, change in database technology, user security etc.

To complete the table below, you should aggregate the count of users from the Tableau users on page 15 tab in the Tableau Blueprint Planner.

<table>
<thead>
<tr>
<th></th>
<th>Year 1*</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total users</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### Resource management

While site administrators should be maintaining fresh and relevant content on their sites as outlined in *Measurement of Tableau user engagement and adoption* on page 127, server administrators have oversight of the entire server and how the server’s resources are utilised as outlined in *Tableau monitoring* on page 91. The standards you define should be documented and published on the *Tableau enablement intranet* on page 165, which is explained in *Tableau communications* on page 165.

### Stale content

If content is published with a scheduled refresh but not viewed, it is consuming system resources and potentially making it harder for users to locate more relevant content. The unused content will also add to backup and restore times. Work with site administrators and/or users to remove stale content two to four times per year. For more information, see the stale content remover workbook.

### Size audit

Monitor content by establishing policies around workbooks and data source size. Set data-driven alerts on the Stats for space usage view to identify which workbooks and data sources exceed the expected size limit. For example, if you set a standard that extract sizes should be less than 1 GB, then alert for anything larger.

### Upgrades

Before you upgrade Tableau Server (*Windows*| *Linux*), you should review and complete the upgrade checklist below and announce the expected downtime to users on the *Tableau*...
enablement intranet on page 165 as shown in Tableau communications on page 165.
Specific tasks related to pre-TSM to TSM version upgrades are designated with an asterisk.

**Research the upgrade**

<table>
<thead>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

Release notes

What’s new in Tableau Server

What's changed: Things to know before you upgrade

- Upgrade from Tableau Server 2018.1 or earlier to TSM*
- Comparing functionality of tabadmin to TSM*
- Upgrade process changes*

Validate sufficient capacity to support workload

- Install on existing hardware
- Migrate to new hardware

**Prepare for the upgrade**

<table>
<thead>
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<th>No</th>
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<tbody>
<tr>
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</tbody>
</table>

Review and validate documented settings in Tableau Server architecture & configuration design document

- Customisation
- SMTP configuration
- SSL configuration and certificates
- SAML configuration, certificates, and IdP metadata files
- Kerberos configuration
- OpenID configuration
- Additional node(s) configuration
<table>
<thead>
<tr>
<th>Prepare for the upgrade</th>
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</thead>
<tbody>
<tr>
<td>Quantify projects, workbooks, views, data sources</td>
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</tr>
<tr>
<td>Quantify users and groups</td>
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</tr>
<tr>
<td>Download setup files for the new Tableau Server version</td>
<td></td>
</tr>
<tr>
<td>Back up Tableau Server data</td>
<td></td>
</tr>
<tr>
<td>Check your product maintenance status</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Prepare a test environment</td>
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<tr>
<td>Upgrade the test environment</td>
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<tr>
<td>Confirm Tableau Server functionality</td>
<td></td>
</tr>
<tr>
<td>Server processes</td>
<td></td>
</tr>
<tr>
<td>User access</td>
<td></td>
</tr>
<tr>
<td>Publishing workbooks and data sources</td>
<td></td>
</tr>
<tr>
<td>View published workbooks</td>
<td></td>
</tr>
<tr>
<td>Subscriptions and extract refreshes</td>
<td></td>
</tr>
<tr>
<td>Permissions</td>
<td></td>
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<tr>
<td>Command-line utilities and APIs</td>
<td></td>
</tr>
<tr>
<td>Performance and user acceptance testing</td>
<td></td>
</tr>
<tr>
<td>Performance resources</td>
<td></td>
</tr>
<tr>
<td>Test workbook performance</td>
<td></td>
</tr>
<tr>
<td>Test new features</td>
<td></td>
</tr>
<tr>
<td>Communicate the planned upgrade window</td>
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</tr>
</tbody>
</table>
Perform the upgrade

Communicate the pending upgrade

Disable subscriptions and scheduling

Create a pre-upgrade backup of Tableau Server data

Uninstall existing pre-TSM version of Tableau Server and save tsbak file to another location*

Upgrade Tableau Server (existing TSM version) or upgrade from Tableau Server 2018.1 or earlier to Tableau Server with TSM (note: Gather existing files section*)

Install initial node

Install other nodes in cluster

Run the upgrade script to complete the installation

Log in to TSM and start Tableau Server

Restore gathered files*

Validate the upgrade

Verify status of Tableau Server processes

Verify Tableau Server settings

Enable subscriptions and scheduling

Modify Tableau Server processes (if needed)

Review user access

Verify publishing workbooks and data sources

View published workbooks

Review permissions
Tableau Blueprint help

<table>
<thead>
<tr>
<th>Perform the upgrade</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify command-line utilities and APIs</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Log in to Tableau Server</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify count of projects, workbooks, views, data sources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify count of users and groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify database connectivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Execute backup script</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Communicate the successful upgrade</td>
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</table>
Tableau education

A person who knows the business, has the context and can realise the full potential of the insights can do powerful things with their data. But having a platform like Tableau and access to data isn't enough: organisations need to ensure that their employees are prepared to use the tools at their disposal effectively. Additionally, businesses need accountability systems in place to make sure that technology is being adopted and used. Without investments in education, analytics programs risk failure.

From acknowledging the importance of data to adapting to modern analytics standards around presentation, distribution and complexity, project team members must develop an education plan to raise the “analytical IQ” across their departments and teams. In addition to Tableau-specific skills, users need to understand the company-specific processes around working with data and become comfortable with technologies that help them to develop data-related skills. Given the vast diversity of skills and backgrounds of employees within an organisation, there is no one-size-fits-all model for training and enabling individuals.

The Tableau platform is purpose-built with many capabilities for enabling content consumers and content creators throughout the modern analytics workflow. To realise the full value of your Tableau investment, an education plan must be built, including:

- Fitting training to user needs and learning style – Role mapping, skills assessments, budgeting
- Different learning paths – Modules for every role and responsibility
- Accountability – Certification and validation of product knowledge

This guide outlines our recommended approach to educating and enabling people throughout the enterprise to get full value out of your data in Tableau.

Tableau licence types

Now more than ever, people need access to data to do their jobs better, but their relationship to data can differ. Tableau’s role-based licences allow you to deploy data broadly across your organisation to users of all skill levels. These roles will allow you to share data with your teams in a secure way, while allowing for the differences in the way people interact with data.
Licence types are hierarchical. With appropriate permissions, Creators can access the full functionality of Tableau Desktop, Tableau Server/Online and Tableau Prep Builder. Explorers have access to a subset of these capabilities via Tableau Server/Online, and Viewers receive a limited set of Tableau Server permissions based on the needs of someone who views and interacts only.

The Creator licence is designed for users who build content. This can include the design, cleaning and curation of data sources, which others will use to analyse governed data, or the creation of visualisations and dashboards with which other users will interact. It also includes designing governance and permissions models that dictate which information users may find.

You might be a Creator if…

- Analytics is in your everyday job description.
- You need to join many data sources together to perform analysis.
- You build or curate data sources for others.
- You need to clean and transform data in addition to analysing it.
- You will manage or administer a Tableau Server or Online implementation.

The Explorer option provides governed authoring and data exploration capabilities for users who do not need the full data transformation capabilities of Tableau Prep Builder, or the ability to publish or connect to raw data sources. Explorers may access and analyse published data, create and distribute their own dashboards, and manage content that they have built or have been given the permission to edit.

You might be an Explorer if…

- You are a line-of-business data user who likes to get hands-on with data.
- You need to create your own visualisations using data sources curated by others.
- You want to take visualisations and dashboards built by others and edit or customise them.
- You will administer content on a Tableau Server or Online site.

Tableau Viewers can view and interact with published visualisations and dashboards. These users can be given permission to access published content and interact with guided drill paths and filters. They can also subscribe to dashboards to get periodic updates and receive data-driven alerts.

You might be a Viewer if…
You need data-oriented insights to do your job, but you don’t have time or skills to do deep analytics yourself.

You want to interact with visuals others have built, but not build your own.

Depending on the level of interest within different business groups in your organisation, your allocation of Creator, Explorer and Viewer licence types will vary. However, a typical Tableau deployment will need to ensure that users with certain responsibilities receive the appropriate licence type and corresponding education.

**Organisational role mapping**

Your organisation is full of people doing different things with data, whether they recognise it or not. Some use data to answer questions to drive their lines of business forwards. Others prepare spreadsheets and reports that they distribute within their department. Others again pull in raw data from cloud applications or grab quick snapshots of important KPIs to use during team meetings.

Each organisational role or job function has a relationship with data that you should identify and map to Tableau roles. Assessing the skills required to operate Tableau in each organisational role requires an understanding of which tasks can be completed with each product, plus an understanding of how those products correlate to Tableau’s licenses that are detailed above. As part of the discovery and planning work you’ll do upfront, you’ll develop a plan for what licenses you need for your near- and long-term roadmap with Tableau.

**Current state**

During the discovery process, the data & analytics survey helped you to identify how data is distributed and consumed within a department and existing skills among team members. When you review your survey results, it will be helpful to bucket users into those who distribute, derive or receive reports.
Current state

Future state

Using information discovered by the data & analytics survey, you should assess each organisational role’s relationship to data, categorise types of users and determine the best fit for education needs by license type. As the future state diagram shows, those who prepared and distributed reports become Creators, and users who modify and combine existing reports are likely Explorers. Viewers are content consumers.

Future state

Skills by Tableau licence type

Tableau has various training modules designed to address each Tableau licence type. More detail on the specific competencies developed in each training module, including timelines, mechanisms to certify users and ways to measure success, are detailed below.
Where available, free modules on tableau.com are listed. These free modules contain on-demand video training, documentation and white papers, and recorded webinars. Free training modules are intended to supplement paid training, which helps build a holistic, foundational understanding of the platform. Organisations that wish to collate free resources to build their own training curriculum may do so; however, we recommend that you consider paid training if possible. In addition to being actively managed and consistently updated by Tableau’s training organisation, these paid classes are instructor-led and prepare users for Tableau’s product certification exams.

- Specialised roles (server administrators, site administrators, data stewards) should plan on 1-2 weeks of training. These users will receive targeted training on tasks relevant to their organisational role.
- Content creators are the power users of your Tableau deployment. While the fundamentals of Tableau can be learned in just a few days, these users should plan on spending 4-6 weeks learning more advanced applications of Tableau’s feature set. These users will find that they learn the most when training sessions are taken intermittently over the training period, with a few weeks in between each class, giving them time to digest and apply the techniques learned in each course before taking a new one.
- Content consumers’ level of engagement with the Tableau will vary. Data consumers who use a Viewer licence will need some precursory direction around how to find content relevant to them and how to access and interact with Tableau dashboards. Users who plan to interact with data more directly by using web authoring capabilities available with an Explorer licence will be most effective after taking the web authoring training course.

Note: Tableau Desktop I, II, III and Prep Builder training are available either in a classroom setting or via eLearning. Server administration, art + data, and web authoring classes are currently classroom-only. Classroom courses can be delivered on-site at your place of business, in-person in a Tableau-provided classroom or in a virtual setting. Visit our classroom training page to learn more.

**Tableau Server administrator skills**

Tableau Server (deploy and operate), Tableau Desktop (server analytics), governance/oversight processes

<table>
<thead>
<tr>
<th>Free training</th>
<th>Paid training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tableau Server administrator videos</td>
<td>Server architecture</td>
</tr>
</tbody>
</table>
Free training

- Admin

Paid training

- Server administration

Starter kits – Administer Tableau

Recommended training path – two weeks of coursework:

- Week 1: Server architecture – Two days in person or four days of virtual training
- Week 2: Server administration – Three days in person or five days of virtual training

Other ancillary knowledge needed for server administrators, which is defined in more detail in Tableau deployment on page 63:

- Scripting for automation
- Command line interfaces and APIs
- Server sizing and topology
- Network infrastructure and protocols

Tableau site administrator skills

Tableau Server, governance/oversight processes, content validation/promotion/certification, Tableau Desktop (site analytics)

Free training

- Admin

Paid training

- Server administration

Site administrator videos

Recommended training path – one week of coursework:

Starter kits – Administer Tableau

- Week 1: Server administration – Three days in person or five days of virtual training
Tableau creator skills

Tableau Prep Builder, Tableau Desktop, Tableau Server, governance processes, visual analysis, communicating with data

<table>
<thead>
<tr>
<th>Free training</th>
<th>Paid training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator videos</td>
<td>• Desktop I: Fundamentals</td>
</tr>
<tr>
<td>• Getting Started</td>
<td>• Desktop II: Intermediate</td>
</tr>
<tr>
<td>• Tableau Prep Builder</td>
<td>• Desktop III: Advanced</td>
</tr>
<tr>
<td>• Connecting to data</td>
<td>• Prep Builder I</td>
</tr>
<tr>
<td>• Visual analytics</td>
<td>• Visual analytics</td>
</tr>
<tr>
<td>• Dashboards and stories</td>
<td>• Web authoring</td>
</tr>
<tr>
<td>• Mapping</td>
<td>• Art + data</td>
</tr>
<tr>
<td>• Calculations</td>
<td>• eLearning</td>
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<tr>
<td>• Why is Tableau doing that?</td>
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<tr>
<td>• How to</td>
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<tr>
<td>• Publish to Server/Online</td>
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<tr>
<td>• Tableau Mobile</td>
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</tbody>
</table>

Recommended training path – Three weeks of coursework:

- Week 1: Desktop I & II, accelerated – Three days of live, in-classroom training
- Week 2: Visual analytics – Two days in person or five days of virtual training
- Week 3: Desktop III, advanced – Two days in person or five days of virtual training

Optional training classes:

- Art + data – This course will help Tableau Creators design more compelling dashboards.
- Prep Builder I – This course will help users who clean data prior to building content make the most of the time they spend cleaning and analysing data.

Additional ancillary skills can be beneficial. For example, the following general competencies required to be a Tableau Creator can be summarised as:
General data knowledge – How to connect to and prepare data, general data structures, joins and basic SQL.

Analytics best practices – Generating data questions, data visualisation, data storytelling.

Business knowledge – Familiarity with the business challenges and metrics monitored by business leaders.

Design fundamentals – Layout/design of dashboards, infographics and other graphical documents.

Employees within the organisation likely already have skills in one or more of these categories. However, for some employees, general training in some of these categories may be an important prerequisite to Tableau training.

Tableau Explorer skills

Tableau Server, governance processes, visual analysis, web authoring, communicating with data

**Free training**

- Explorer videos
  - Getting Started
  - Interacting with content on TS
  - Subscriptions & data-driven alerts
  - Tableau Mobile
  - Web authoring
  - Dashboards and stories
  - Mapping
  - Calculations
  - Why is Tableau doing that?

**Paid training**

- Web authoring
- Art + data
- eLearning

Recommended training path – one week of coursework:

- Week 1: Web authoring – Three days of 2.5-hour virtual sessions

Optional training class:

- Art + data – For users who expect to do frequent web authoring, this course will help users understand how to create clear, communicative visuals
Tableau Blueprint help

<table>
<thead>
<tr>
<th>Free training</th>
<th>Paid training</th>
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<tr>
<td>- How to</td>
<td></td>
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<tr>
<td>- Publish to</td>
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<tr>
<td>Server/Online</td>
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<tr>
<td>- Visual</td>
<td></td>
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<tr>
<td>analytics</td>
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</table>

Starter kits –
Interact 1-6

Additional ancillary skills can be beneficial for Explorers, such as:

- Analytics best practices – Generating data questions, data visualisation, data storytelling
- Business knowledge – Familiarity with the business challenges and metrics monitored by business leaders.
- Design fundamentals – Layout/design of dashboards, infographics and other graphical documents.

Tableau Viewer skills

Tableau Server, visual analysis, interacting with data

<table>
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<tbody>
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<td>- Getting started with Tableau Server</td>
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<tr>
<td>- Interacting with content on Tableau Server (viewer)</td>
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</tr>
<tr>
<td>- Navigating the Tableau Mobile app</td>
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<tr>
<td>- Interacting with content in the Tableau Mobile app</td>
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</tr>
<tr>
<td>- Tableau on the phone</td>
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</tbody>
</table>

Starter kits – Interact 1-3
Educational content curation

While Tableau’s paid training offerings come with a sequence and timeline for consuming the materials, organisations that want to curate their own training materials for Tableau users will need to collate Tableau documentation, videos and other resources for easy access. In addition, organising these materials into a programme with recommended coursework and sequencing can help users get up to speed efficiently.

All videos, transcripts and related files may be downloaded in bulk and curated in your organisation’s learning management system (LMS) or published to your enablement intranet. In-house trainers may supplement the free training materials offered by Tableau with their own practice exercises or data sets relevant to their organisation.

Recommended coursework for each role can be found in Tableau’s starter kits. These starter kits organise Tableau training videos, reading materials, community events and product practice exercises into sections that allow users to educate themselves while engaging with progressively more advanced product capabilities.

In addition to the starter kit content, add your own organisational context to help users learn how to apply Tableau product skills to their day-to-day job functions, company sources of data and your own organisational best practices. Educational goals should be time-bound, and users should be given adequate time to complete them. In the example below, the syllabus is based on the Author a viz starter kit.

Example syllabus

Course summary: In this four-week course, you will learn the fundamentals of Tableau, including visual analytics, dashboard creation, formatting and design, and calculations. After completing this course work, you will be able to:

- Connect to data, combine and clean multiple data sources.
- Ask analytical questions of data using Tableau Desktop or web authoring.
- Create visualisations and interactive dashboards.
- Publish your visualisations for others to view and analyse.

Coursework:

Week 1 – Getting started

- Download Tableau
- Engage with the community
Tableau Blueprint help

- Read about visual best practices and discover meaningful visualisations
- Connect to and manage data

Week 2 – Build visualisations and dashboards

- Basic viz creation
- Sorting, grouping and filtering
- Maps, combination charts and time-series analysis
- Aggregation, granularity and ratios
- Interactive dashboards

Week 3 – Advanced applications

- Types of calculations
- Modifying quick table calculations
- Examples of LOD expressions
- Troubleshooting calculations
- Sentiment, market basket and other advanced analyses

Week 4 – Publishing content to Tableau Online or Tableau Server

- Publishing dashboards
- Basic permissions settings and user filters
- Designing for different devices
- Collaborating with other users

Tracking progress

Regular measurement of user engagement will reveal the ways that users are interacting with Tableau content and help you to understand adoption, which are both outlined in Measurement of Tableau user engagement and adoption on page 127. However, planning your strategy will result in a better fit of educational content to each user’s unique skillset than through usage monitoring alone. Line-of-business and technology leaders can assign training modules based on job responsibility, or fit training options to individuals based on the time, budget, and skills associated with people in their organisation.
Product certification

Tableau certifications help to demonstrate competencies and recognise expertise at various skill levels:

- Desktop Specialist – Foundational functionality and product comprehension
- Desktop Qualified Associate – Comprehensive functionality and product expertise
- Desktop Certified Professional – Advanced functionality and application of visual best practices
- Server Qualified Associate – Administrative functionality and platform knowledge
- Server Certified Professional – Architectural knowledge and platform integration expertise

Exams are available online, or during select in-person events. Learn more by visiting the Certifications page.

Skill belt programme

A skill belt programme provides a pathway for a user to develop skills and establish a common language across an organisation for abilities at measured levels of knowledge and competency. Such a programme should be designed to sequentially build skills and knowledge across product functionality, storytelling, design, visualisation and performance best practices, and community resources. This will enable you to quickly scale both horizontally and vertically to help ensure that you are maximising your investment in Tableau by creating deep pools of highly skilled users throughout your organisation.

To ensure participation, each skill level should have a volunteerism requirement that must be met prior to level recognition. We believe there is no better way to organically build community than connecting new applicants with peers and mentors. This encourages users to share knowledge, evangelise data-driven decision-making, and improve Tableau skills and solutions across the organisation.

Such a programme relies on both applicants and champions for administration, governance and promotion. Depending on the size of your organisation, you may have resources that can help administer the programme. For example, many large organisations have a learning management system and may prefer to manage written skills assessment within that content delivery system.

Content can be standardised across belts and merit badges, for example:

- Hands-on – Instructional videos or webinars that the user can follow along with, often including an accompanying Tableau workbook.
Tableau Blueprint help

- Best practices – Content generally focused on visual and performance best practices. At higher levels, we begin to introduce more technical and governance-related topics.
- Storytelling – Content that specifically addresses the soft skills for effectively telling stories with data.
- Blog – Informational content across the six content themes from a variety of sources, generally from Tableau or notable public community figures like Zen Masters. These pieces of content may have hands-on activities, best practices or additional resources that users return to.
- Resource – A reference document, community guide (e.g. GitHub), other instructional reference materials (e.g. chart hierarchy) and supplemental books.
- Challenges – Hands-on Tableau workbook challenges and solutions.
- Milestone – Skill assessment tasks (e.g. a test) that are required to achieve a skill belt or merit badge

It is important to note that you should not expect everyone to engage in all the content available, or master all the skills available at every skill belt level. Mastery should not be required to advance through the programme, but exposure to these concepts and building knowledge is important. For example, you can be recognised at an expert level without having to script in Python. You shouldn't expect everybody to code in Python, but your users should have an understanding of how Python and Tableau can be used together – and more importantly, who in your organisation this can help.

Gamification

A defining characteristic of any skill belt programme is the gamification of learning. Gamification is an educational approach that motivates students to learn by using game elements and design in a learning environment. It can help users overcome fatigue or anxiety and keep them engaged. By incorporating the right mechanics, gamification can increase engagement and participation and inspire users to continue learning.

One successful way to gamify is by offering compensation or a reward (e.g. organisational status) for academic achievements, proper behaviour and social engagement like helping peers, commenting and adding value. Skill belts and merit badges can be designed to recognise academic achievement and volunteerism while communicating status or prestige within your organisation.

To encourage engagement, you should come up with fun skill belt and badge names. “Jedi Master” sounds a lot more exciting than “Analytics Expert.” Perhaps you want to involve your...
community in picking the belt names (e.g. a competition). If your community picks the names, they are already invested in success before you have kicked off the programme.

Another important feature of gamification is to make the programme as social as possible to simulate the feeling of a classroom or classroom community. This is important for achievers that need peer recognition, but also motivates through peer pressure or friendly competition with other participants. You can have a leaderboard to display top scores and vizzes, for example. We also suggest events such as Makeover Monday and viz games to increase competition and provide additional reward and recognition opportunities.

Lastly, the programme should be transparent to participants. While advancing within the coursework, users know what the next step is and what to expect. This creates anticipation! Anticipation is a strong motivator and gets students excited and engaged for longer periods of time and into the flow of learning.
Measurement of Tableau user engagement and adoption

As Tableau is deployed broadly across your organisation to users of all skill levels, administrators need to ensure that the content that is being created and consumed is discoverable, fresh and relevant to your audiences. To accomplish this, administrators should measure user engagement and adoption.

Measurement helps your deployment to operate at scale and evolve. It helps you understand user behaviours: who is creating and consuming content, the quality and relevance of the dashboards and data sources being published, and the use of certified versus sandbox. If content isn’t being consumed, you will be able to identify it and take the appropriate next steps.

Understanding the relationship between data sources and workbook content, users and server performance, scalability, and sizing is a reliable way to look into current usage and future growth. Open communication between server administrators and site administrators is needed to plan for new users and use cases on the platform. Consider this:

- A team or group of users has a known collection of sources of data that can be identified and prepared for them as published data source or embedded in workbooks.
- Published data source, as well as embedded data sources, are used to populate dashboards.
- Dashboards have a specific audience, or group of users who should view them. User engagement drives server scalability and sizing decisions.
- Server sizing decisions define hardware and licensing requirements, which are aligned with budget planning and procurement requests.
Tableau administrative roles and responsibilities

Depending on the size of the organisation and deployment, measurement and monitoring responsibilities may be split across different teams. For example, a systems administrator may be responsible for the hardware and operating system only, while Tableau Server administrators will monitor and track key application metrics, and site administrators will measure content metrics in their respective site(s). Both are equally important for overall success.

If there are no site administrators, both application and content metrics should be monitored and measured by the server administrator. Regardless of the deployment size, system performance is a shared responsibility among administrators and users. For more information on hardware metrics, see Tableau monitoring on page 91.

Tableau administrative views

Data from the Tableau Server repository will be analysed using default administrative views and custom administrative views. Administrative views are dashboards that are included with Tableau Server and help you understand how users are interacting with content. Site administrators have access to Tableau Server’s default administrative views.

Find administrative views on the status page

Brief descriptions of the site default administrative views are shown below. Site administrators should view these on a weekly basis to understand users’ behaviour.

- Traffic to views – Usage and users for published views. Compare the traffic to the expected audience size.
- Traffic to data sources – Usage and users for published data sources. Compare the traffic to the expected audience size.
- Actions by all users – Actions for all users to see site activities.
Tableau Blueprint help

- **Actions by specific user** – Actions for a specific user, including items used.
- **Actions by recent users** – Recent actions by users, including last action time and idle time.
- **Background tasks for extracts** – Completed, pending and failed extract task details with full details of why an error occurred.
- **Background tasks for non-extracts** – Completed, pending and failed non-extract background task details with full details on why an error occurred.
- **Stats for load times** – View load times and performance history. Set **data-driven alerts** on long view load times using the version of the default admin views workbook you downloaded and published with extracted data sources.
- **Stats for space usage** – Space used by published workbooks and data sources, including extracts and live connections. Set **data-driven alerts** on the Stats for space usage view to identify which workbooks and data sources exceed the expected size limit. For example, if you set a standard that extract sizes should be less than 1 GB, then alert for anything larger.

Custom administrative views are useful for deeper analysis of user behaviour and organisation-specific KPIs that are identified. The Tableau server administrator will extract and publish the default administrative views workbook and **community data sources** so others can perform deeper analysis on users within your site. This will permit users and project leaders who manage content (but are not full administrators) to view and measure consumption. The list of recommended published data sources is shown below:

- **TS users** – Aggregated information on user activity.
- **TS content** – High-level, summarised data for each view, workbook and published data source on Tableau Server.
- **TS background tasks** – Primarily for analysing extract refresh and subscription tasks that are run on backgrounder processes.
- **TS events** – Essentially a master audit data source showing events happening on Tableau Server: users signing in, accessing views, publishing content, etc.
- **TS data connections** – Maps both workbooks and published data sources to their underlying data connections. Useful for answering questions about what workbooks connect to what data source, which then connects to what database(s)?
Tableau Server content utilisation

Utilisation is the effective use of the data visualisations for business decisions, but the complete picture cannot be told through traffic to views alone. When viewing this data, put it in the context of your expected audience size that was documented on the Use cases tab of the Tableau Blueprint Planner.

For example, if a published data source has an audience of 500 users who should use it at least once a day, then we would expect the Traffic to views dashboard to show approximately 10,000 views in a month (20 business days * 500 users). Now, if 250 people view the dashboard 2 times a day, then you’re at 50% engagement and that’s your cue to understand whether the information is relevant, there is a skills gap, or half the audience doesn’t realise that such a dashboard that will help them do their job even exists.

Individual content creators can see utilisation for their content in the sparkline tooltip by hovering over the workbook’s thumbnail or selecting “Who has seen this view” from the menu.

Content utilisation

1. Within a site or project, what is the view traffic? (Monthly) – Understanding the usage trend for a site and project will help you understand growth or whether additional community activities can educate users on available content. Below, you can see traffic in the project represented in red has dropped off dramatically, while the remaining colours at the bottom are flat.
2. What is the view traffic in the last 180 days vs 30 days? (Monthly) – Low traffic views should be reviewed and archived based on an activity threshold within a given time period. If content is published but not viewed, it is consuming system resources and potentially making it harder for users to locate more relevant content. Your server administrator can automate archiving per site. In the example below, only three dashboards (orange) have had been accessed in the last 30 days.
3. What is a workbook’s audience size relative to access events? (Monthly) – When identifying use cases for new content, you should estimate the audience size for a particular workbook. By comparing the distinct count of consumers to the number of access events, you can understand the impact of content. Content in the lower left (low audience/low traffic) should be reviewed and removed if it is no longer useful.

4. What is a data source’s audience size relative to access events? (Monthly) – Similar to the previous example, when identifying use cases for new content, you should estimate the audience size for a particular data source. By comparing the distinct count of consumers to the number of access events, you can understand the impact of content. Content in the
lower left (low audience/low traffic) should be reviewed and removed if it is no longer useful.

5. Who is creating/owning content? (Monthly) – Users who create and share content are putting your organisation’s modern analytics vision into practice. To understand who is publishing to Tableau Server, review project, workbook, and certified and uncertified data source owners.
Tableau user engagement

Engagement is a measure of user behaviour, both direct and indirect. Direct engagement includes viewing and interacting with a dashboard, connecting to a data source and web authoring. Indirect engagement includes subscriptions and alerts that are delivered to a user.

1. How many times have users logged in? (Monthly) – To measure user engagement, you should start by quantifying the number of logins, users who logged in once and didn’t return, and users who never logged in. If twelve users have logged in once and didn’t return, you should determine why.

Login frequency

2. Is the use of content becoming habitual? (Monthly) – Quantifying the number of days since last login is a good indicator of whether users are in Tableau Server. For example, with 4,065 users logging in to Tableau Server from 0-49 days, use of Tableau Server is high. This can be especially useful if HR data is joined to view engagement within a department or team.
Days since last login

3. Are subscriptions and alerts being used? (Monthly) – It’s important to consider the direct (publish, view and interact) and indirect (subscriptions and alerts) activity on Tableau Server. Even if users are not interacting directly with content, they may be receiving emails from subscriptions and alerts.

Subscriptions & Alerts

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<th>Alerts</th>
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</tbody>
</table>

Subscriptions & alerts
Content size and performance

Performance is a shared responsibility in Tableau Server because of the cumulative effects of slow dashboards and long-running extract refreshes can have on the entire system. Based on performance thresholds you define, you should work with users to improve performance to expectations. The dashboards below can be found in the default administrative views on Tableau Server.

1. What is the distribution of workbook and data source size? (Weekly)

2. How long does it take for views to load? (Weekly) – Have you set a load time expectation to identify when a workbook is loading too slowly? Do you have an exception procedure in place?
3. How are extracts performing? (Weekly) – See the successes and failures of extracts and determine if you’re experiencing long extract refresh times.

4. Are subscriptions delivered on time? (Weekly)
Compliance

Compliance is the measure of how closely users are following internal company policies and procedures and external regulations where applicable. Below are some examples of policies to be defined or may already be in place:

1. Are usernames and passwords using a service account or an individual account? (Weekly)
2. Are embedded passwords elevating permissions for data access? (Weekly)
3. When implementing row-level security at the Tableau data source or dashboard level, are appropriate measures taken on user permissions? Such as who can and cannot edit/download data? Can the RLS be pushed to database level?
4. Are visual styles being adhered to? (Colours, branding, type of visualisation, etc.)
Analytics best practices in Tableau

Analytics best practices enable your users with guidelines, standards and processes for discovering, interpreting and presenting data. In addition to the common best practices listed here, consider what additional organisation-specific practices you will layer on top to enable your users with repeatable processes that will evolve into analytical capabilities.

Once defined, you should publish your organisational best practices to the Tableau enablement intranet on page 165. A mix of pre-recorded content, web meetings and in-person sessions should also be used to introduce, reinforce and institutionalise best practices as part of transforming into a data-driven organisation. While not intended to be an exhaustive list, this document compiles some of the most common analytics best practices.

Why visual analytics?

Visual analytics is a means of exploring and understanding data. It supports and accelerates the analysis process itself. You can ask a question, get the answer and ask follow-up questions – all within a visual interface. A story unfolds from one visual summary to another. Later, you can retrace the story to rethink, explore further and share. In short, visual analytics allows you to go in any direction with your thoughts while you view and interact directly with the data.

Pre-attentive attributes

Visual analytics leverages pre-attentive attributes to guide you down the most useful paths. Pre-attentive attributes are information we can process visually almost immediately, before sending the information to the attention processing parts of our brain. The pre-attentive attributes are shown below.
Pre-attentive attributes

These are generally the best ways to present data, because we can see these patterns without thinking or processing. In fact, these attributes evolved in humans as ways to quickly assess a situation, discern a pattern and choose whether to react. When authoring visualisations in Tableau, content creators will be visually encoding data to reveal new insights.

Explaining visual encoding

As you deploy Tableau broadly across the organisation, some people will see the immediate value of visual analytics while others may hold on to traditional spreadsheets or reports in a tabular format. You will likely need to communicate the value of visual analytics and help those people see data differently by walking through what’s possible when data is visually encoded – namely by using colour, shape and size.

The steps below are helpful in making data visualisations more familiar if you are creating them for someone else. First, start with a familiar tabular format. Here is an example of how someone might view sales and profit in a text table. To find the highest and lowest values, it requires a full table scan of the rows and columns.
## Tabular data, plain

Adding colour to negative numbers and formatting them with parentheses makes them stand out, but only if you’re looking for negative numbers. For everything else, a table scan is required to compare values.

### Sales & Profit Table

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<th>East Sales</th>
<th>Profit</th>
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</tr>
</tbody>
</table>

Tabular data with a colour for negative values

### Tableau Software

Version: Current
Next, as an intermediate format between a text table and a full visualisation, colour can be applied to the sales and profit measures individually to show high and low values, but it still requires the viewer to reconcile ranges of colour between the two measures.

Tabular data with sales and profitability by colour gradients

Finally, show the full visualisation with sales encoded by length and profit encoded by colour. Immediately, the viewer can see highest sales and lowest profit.

Visual data with sales by bar length, profitability by colour
Using this approach, you will be able to introduce and explain the benefits of visual analysis to your organisation’s Tableau users. You should record your own introduction video and post it on the enablement intranet.

**The cycle of visual analysis**

Visual analysis is a non-linear process. For example, a user might start with an initial task or question in mind, find relevant data and prepare it for analysis. During analysis, they realise that they need additional data, so they go back a couple of steps to get more data, choose a new visual mapping and develop a new insight. This example can be repeated for any of the other steps of the cycle of visual analysis.

The flow of analysis is difficult or impossible to achieve in traditional BI. Instead of exploiting the power of visual cues and iteration, it is heavily milestone-driven. Requirements gathering leads to development, then to testing and eventually to launch. With visual analysis, the steps become more fluid as the answer to one question often leads to other questions, and new insights are uncovered.
Start with questions

Whether you are authoring for yourself or for others, the cycle of visual analysis starts with a task or business question to be answered. When asking data questions, start with a broad topic then add specificity to each question as shown in the dashboard design worksheet in the appendix. For example, a call centre manager’s questions from summary to detail might look like the following:

- How many calls are received every month?
- Where do the calls come from?
- What are the top call types?
- Who answers the most/fewest calls?

Often, the person analysing the data also understands the underlying business questions. In other cases, someone might come to you with a need for a dashboard and what business questions it needs to address. Regardless of what the process of requesting this kind of assistance is, the steps for success are similar.

- Build rapport for a productive working relationship built on trust. Find out about their experiences and try to speak their language.
- Ask open-ended questions like "What do you want this dashboard to tell you?" or "What question do you want to answer?" rather than "Do you want a line graph?" or "Should I make a trend line?"
- Use examples: Show existing dashboards and ask what would make them better.

Get data

Your users have questions that can be answered with data, but do they know how to find the right source of data and connect to it? From a variety of structured, semi-structured and raw sources of data to siloed data within different departments of the organisation, knowing where to get the right data is one of greatest barriers to becoming a data-driven organisation.

During the discovery process, the Tableau data and analytics survey on page 12 in the Tableau Blueprint Planner identified key sources of data and how data is distributed and consumed within each department or team. With specific sources of data documented in the Tableau use cases and data sources on page 13 tab of the Tableau Blueprint Planner, you should prioritise which ones will be most impactful by audience size and create published data sources in Tableau Server.

Beyond the initial use cases, content creators should understand how to get data to answer new business questions. Using the data & analytics survey is a repeatable way to discover new
use cases and assess whether the needed data exists already in Tableau Server. If it is already available as a published data source, then content creators can connect to it and begin analysing it. If it does not exist, authors should collaborate with data stewards and work with the data they have – even sample data files – and prototype with the data available, rather than waiting to proceed with a perfect operationalised dataset. Once the full data set is available, the operationalised dataset will replace the sample.

Choose visual mapping

After getting data, content creators will start to explore data by adding measures and dimensions to the view, and Tableau will present users with the most effective visualisation. The type of visualisation can be changed at any time when authoring content. As creators explore the data and visually encode it with the pre-attentive attributes, they will be able to derive insights from it.

Choosing the appropriate type of visual mapping for the type of analysis is critical for deriving insights and driving towards action. There are five primary types of visual mapping that content creators and consumers should understand:

- Comparison, represented as a bar
- Spatial, represented as a map
- Temporal, represented as a line
- Compare two measures, represented as a scatter plot
- Precise number, represented as a text table

View data

Tableau visualisations often show the unexpected: relationships, outliers and trends. A surprise finding stimulates the thought process, encouraging deeper analysis or a different path of exploration. Tableau’s interaction model is based on the concept of incremental change: Whenever you perform an action (e.g. filter), Tableau instantly shows you the new result.

Why is incremental change important? It lets us intuitively explore a broad space of possible visualisations to find the right one. It allows us to focus on the exploration task, where questions lead not just to answers but also to more questions. It also lets us learn visual analytics at our own pace. We can build sophisticated representations of data slowly and incrementally as we learn how to look at information. Tableau’s interface is based on the process of incrementally refining a question into an answer. Every Tableau user, not just analysts, needs to be able to derive meaningful information from data and base their decisions on data.
Develop insights

Data analysis and data visualisation were once separate tasks. An analyst would run queries or write calculations to get answers from a data source, and then export results as a specified chart or graph. But by making the process of querying data visual, you can explore your data in a richer, more meaningful way. With visual analytics, you can build an analysis and learn from it simultaneously as opportunities for further investigation present themselves.

Critical thinking with data is about finding insight and communicating the insights in an optimal, engaging way. Visual analytics makes asking and answering questions of your data intuitive, regardless of whether you are a creator or a consumer – as we continue to ask “why”.

Critical thinking with data is important to the decision-making process for both content creators (often analysts, developers or data scientists) as well as for information consumers. Both groups should ask themselves these questions as they develop insights:

- What question should I ask?
- And when I get the answer, do I trust it?
- Do I have the ability to question whether my data is useful? Whether it’s correct?
- Am I using all the facts? Am I trying to confirm any biases I already have?

Act (share)

Shared findings lead to actions, results and solutions. In fact, unshared discoveries are useless. You can share different types of content via Tableau Server:

- Tableau Prep flows: Prep flows can be published to Tableau Server and scheduled to run when you need them to with Prep Conductor.
- Published data sources: You can publish data sources that others can use to build new workbooks. A data source can contain a direct (or live) connection to your database or an extract you can refresh on a schedule. For more information, see Best practices for published data sources and Enabling governed data access with Tableau Data Server.
- Workbooks: Workbooks contain your views, dashboards, stories, and data connection. You can include local resources, such as background images and custom geocoding, if they reside in a location that the server or other Tableau users cannot access.

A dashboard checklist is a useful resource to ensure that published content meets the purpose and answers the business questions intended. Data stewards should also play a role to ensure accuracy and review an embedded data source as a potential candidate for publishing and certifying. Beyond data and calculation accuracy, content validation should also include a review of the branding, layout, formatting, performance, filters, dashboard actions and edge
case behaviours by the site administrator or project leader site roles. For more information on content validation, promotion and certification, see Tableau governance on page 27.

Visual best practices

Visual best practices are key to developing informative visualisations that drive your audience to act. A dashboard is successful when people can easily use it to derive answers. Even a beautiful dashboard with an interesting data source could be rendered useless if your audience can't use it to discover insights.

Think not just as an analyst but also as a designer and consumer. Dashboards should have interactive elements that are discoverable and predictable, follow a sensible, logical layout, and have a simplified design that makes complex decisions easier. It is important not to assume that people automatically know what it takes to clearly and effectively communicate with data. Here are a few white paper links to share on your enablement intranet:

- Visual analysis guidebook
- Which chart or graph is right for you?
- Good enough to great
- Designing efficient workbooks

You can find a list of books by renowned data visualisation experts in the appendix. Adding these white papers and books to the resources of your analytics community can lead to a deeper understanding and internalisation of visual best practices.

Audience

The best visualisations have a clear purpose and work for their intended audience. It's important to know what you are trying to say and who you are saying it to. Does your audience know this subject matter extremely well or will it be new to them? What kind of cues will they need? Thinking about these questions before you begin designing will help you create a successful dashboard. For example, you would present aggregated, summary-level data and KPIs to an executive audience rather than row-level transactions.

Context

Make sure your views include context. Titles, captions, units and commentary all help your audience to better understand your data view. Always strive to tell stories with your data and
your visuals. Understand that good stories involve more than just data, and consider the following:

- Mind your aesthetics and know that what is effective is often affective. In other words, an effective view can create an emotional response and genuinely communicate something to your audience.
- Style is also important. Make sure that your views are consistent and pleasing to the eye. Your views are representative of who you are and what you care about.
- Dashboards that people can interact with are very engaging. Interactive elements allow your audience to manipulate the data, ask and answer questions, and arrive at findings on their own. This helps to foster trust in your data.
- Make your views vivid and memorable. Pay attention to structure and context.

**Chart choice**

*Chart choice* should depend on the question you are trying to answer or a specific insight you are trying to communicate. There is almost always a trade-off involved, with different chart types each having their own advantages and downsides. You should always ask yourself if your chosen chart type best conveys the message you are trying to share and if it can be easily understood by your audience. The table below explains the chart types in Tableau’s Show Me panel and when to use each. This should be published to your enablement intranet to educate new users.

<table>
<thead>
<tr>
<th>Chart</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line</td>
<td>Viewing trends in data over time.</td>
</tr>
<tr>
<td><img src="chart.png" alt="Line Chart" /></td>
<td>Examples: Stock price change over a five-year period, website page views during a month, revenue growth by quarter.</td>
</tr>
<tr>
<td>Bar</td>
<td>Comparing data across categories.</td>
</tr>
<tr>
<td><img src="chart.png" alt="Bar Chart" /></td>
<td>Examples: Volume of shirts in different sizes, website traffic by origination site, percent of spending by department.</td>
</tr>
<tr>
<td>Heat map</td>
<td>Showing the relationship between two factors.</td>
</tr>
<tr>
<td><img src="chart.png" alt="Heat Map" /></td>
<td>Examples: Segmentation analysis of target market, product adoption across regions, sales leads by individual rep.</td>
</tr>
<tr>
<td>Chart</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Highlight table</td>
<td>Providing detailed information on heat maps.</td>
</tr>
<tr>
<td>Examples:</td>
<td>The percent of a market for different segments, sales numbers in a</td>
</tr>
<tr>
<td></td>
<td>particular region, population of cities in different years.</td>
</tr>
<tr>
<td>Treemap</td>
<td>Showing hierarchical data as a proportion of a whole.</td>
</tr>
<tr>
<td>Examples:</td>
<td>Storage usage across computer machines, managing the number and priority</td>
</tr>
<tr>
<td></td>
<td>of technical support cases, comparing fiscal budgets between years.</td>
</tr>
<tr>
<td>Gantt</td>
<td>Showing duration over time.</td>
</tr>
<tr>
<td>Examples:</td>
<td>Project timeline, duration of a machine’s use, availability of players on</td>
</tr>
<tr>
<td></td>
<td>a team.</td>
</tr>
<tr>
<td>Bullet</td>
<td>Evaluating performance of a metric against a goal.</td>
</tr>
<tr>
<td>Examples:</td>
<td>Sales quota assessment, actual spending vs. budget, performance</td>
</tr>
<tr>
<td></td>
<td>spectrum (great/good/poor).</td>
</tr>
<tr>
<td>Scatter plot</td>
<td>Investigating the relationship between different variables.</td>
</tr>
<tr>
<td>Examples:</td>
<td>Male versus female likelihood of having lung cancer at different ages,</td>
</tr>
<tr>
<td></td>
<td>technology early adopters’ and laggards’ purchase patterns of smart phones,</td>
</tr>
<tr>
<td></td>
<td>shipping costs of different product categories to different regions.</td>
</tr>
<tr>
<td>Histogram</td>
<td>Understanding the distribution of your data.</td>
</tr>
<tr>
<td>Examples:</td>
<td>Number of customers by company size, student performance on an exam,</td>
</tr>
<tr>
<td></td>
<td>frequency of a product defect.</td>
</tr>
</tbody>
</table>
**Chart**

<table>
<thead>
<tr>
<th>Symbol maps</th>
<th>Use for totals rather than rates. Be careful, as small differences will be hard to see.</th>
<th>Examples: Number of customers in different geographies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area maps</td>
<td>Use for rates rather than totals. Use sensible base geography.</td>
<td>Examples: Rates of internet usage in certain geographies, house prices in different neighbourhoods.</td>
</tr>
<tr>
<td>Box-and-whisker</td>
<td>Showing the distribution of a set of a data.</td>
<td>Examples: Understanding your data at a glance, seeing how data is skewed towards one end, identifying outliers in your data.</td>
</tr>
</tbody>
</table>

**Layout**

How your audience “reads” your dashboard is not a trivial consideration. Your dashboard’s purpose is to help guide the reader’s eye through multiple views in coordination and tell the story of each insight. Your dashboard needs a sensible “flow” and a logical layout of different pieces of information. The more you employ better dashboard design, your users will discover what’s happening, why and what’s most important. Consider how you’re guiding their eyes across the dashboard. Are you showing the user where to look next?

Design theory gives us plenty of advice on how best to succeed. Layout is a key component of any successful dashboard design. Here are a few concepts you want to think about when building visualisations:

- **Newspaper or Z-layout** – The most important content is put either at the top or the left of a visualisation, as users move right and down for more specific content.
- **White space** – Using negative space (blank spots) and padding to delineate sections of your visualisation – don’t use thick “grid lines” as you would see in a table.
- **Size** – More important pieces of content (KPIs, summary visualisations, etc.) should be larger than other items.
- **Device type** – With device-specific dashboards you can create the optimum viewing experience on desktop, laptop, tablet and phone.
Colour

Colour is one of the most powerful aesthetic features because it’s an attention-grabber. It’s the first thing we notice, and it can immediately highlight specific insights or identify outliers, but it is not an unlimited design resource.

Using colour effectively is critical for producing quality data visualisations. Colour types (alerting vs highlighting), creating custom colour palettes, and consistency are key aspects to build into your standards.

The correct use of colour is critical for producing coherent and impactful data stories. The key factors that should be taken in to consideration for any successful dashboard are:

- Managing colour choices — The primary colour(s) that make up most of your design should be a neutral colour. Using techniques like greyscale, you maximise the possibility for contrast and visibility of your data-driven points. Your extended colours – accents, emphasis, and alerts – should reflect the brand. Any extended colour should be used sparingly to draw attention to key messages within the data.
- Colour types – Understand when to use sequential, diverging, categorical, highlighting or alerting colour motifs.
- **Custom colour palettes** – Build your own company palettes to bring a sense of uniformity and provide guiderails for new users.
- Consistency – Double-check your visualisations to make sure a colour (e.g. red) does not mean three different things. Similar and repeated colours can imply a relationship where one doesn’t actually exist.
- Accessibility – Remember to account for colour blindness in the design process.

Titles & subtitles

Titles are an easy way to make your dashboard more digestible for your audience. You add more context with subtitles that describe how to interact with the worksheet or dashboard. This is a powerful and simple way to make dashboards easier to navigate. In the example below, the question pulls the audience in and then tells the audience how to answer the question using the dashboard.
Effective title and subtitle

Similarly, by changing your filter title to something more intuitive, you guide viewers through how to interact with a dashboard.

Example of a filter

**Tooltips**

Tooltips guide the audience by highlighting important information. In the example below, the county and state are highlighted through a bold effect and colour change, and we don’t have to partition our scatter plot further. We add important and related dimensions and measures in
Tableau Blueprint help

the tooltip. This helps save space and de-clutter the dashboard so our viewers can focus on gleaning insights instead of interpreting the visualisation.

Effective tooltip

If the viewer notices something interesting in the tooltip, they can interact directly with it and watch the rest of the visualisation come to life, highlighting related marks and outliers.
Formatting a tooltip

Fonts

Typography is important. It can be tempting to use many font types and sizes in a dashboard. Don’t do that; instead, define a clear hierarchy for your typography. In the example below, there is a top-, mid- and low-level font. The mid-level is blue to focus viewer attention. Colour draws the eye to the most important level (which needn’t necessarily be the top-level font).
Make sure that font selection is done to reinforce a visual hierarchy within your visualisation through size, boldness, colour and type.

- **Size** – Larger elements convey importance, as they catch the eye. Save your largest fonts for KPIs, titles, etc.
- **Boldness** – Bolder elements convey importance as they catch the eye. You can vary boldness throughout your visualisation in conjunction with size. For example, your title and KPIs could both be 24pt font, but making your KPIs bold will “pop” them, allowing your audience to focus there first.
- **Colour** – Generally it’s good to stick with grey and black hues in your titles, text and KPIs. You can “pop” your KPIs by giving them a colour treatment, but you have to balance this with the other colours used in your visualisation. Darker colours will draw the eye, so it’s wise to lighten your titles so they don’t compete for visual attention.

### Dashboard size

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

If you’re using Tableau Desktop to create dashboards, you can also design for specific device layouts, so that on tablets, for example, your dashboard contains one set of views and objects, and on phones it displays another. See Create dashboard layouts for different device types for steps.

Dashboard interactivity

When designing a dashboard, you need to consider your audience and how you can communicate to them that they can interact with the dashboard. Skilled users know to click and experiment, but new users may not have the knowledge or confidence. Your job is to help them make these decisions consciously, not by accident.

It’s important to make any interactivity obvious to your audience – even by creating subtitles to instruct them to click or hover for more information. Add interactivity to your data using filters, tooltips and actions. Filters are the most obvious way to interact with a dashboard. Users can also interact with your visualisations by selecting marks and hovering to see tooltips. The actions you set up can respond with navigation and changes in the view. The table below enumerates the ways to create interactivity in your dashboards.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highlighting &amp; highlight actions</td>
<td>* Easily find data of interest while remaining within context.*</td>
</tr>
<tr>
<td></td>
<td>* See other marks with shared attributes.</td>
</tr>
<tr>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Filtering &amp; filter actions</td>
<td>- Focus on data you want to analyse.</td>
</tr>
<tr>
<td></td>
<td>- Control context of data.</td>
</tr>
<tr>
<td></td>
<td>- Show relevant data and remove unnecessary data.</td>
</tr>
<tr>
<td>Parameters</td>
<td>- Explore what-if scenarios.</td>
</tr>
<tr>
<td></td>
<td>- Customise your views.</td>
</tr>
<tr>
<td></td>
<td>- Enhance dashboard flexibility.</td>
</tr>
<tr>
<td>Sets &amp; set actions</td>
<td>- Dynamically update the members of a set.</td>
</tr>
<tr>
<td></td>
<td>- Compare parts to whole.</td>
</tr>
<tr>
<td></td>
<td>- Seamlessly drill down through hierarchies.</td>
</tr>
<tr>
<td></td>
<td>- Update a calculation by interacting with data.</td>
</tr>
<tr>
<td>Tooltips</td>
<td>- Provide details on demand.</td>
</tr>
<tr>
<td></td>
<td>- Keep your dashboard minimalistic.</td>
</tr>
<tr>
<td></td>
<td>- Insert a viz in a tooltip.</td>
</tr>
<tr>
<td>URL actions</td>
<td>- Incorporate external content in a dashboard.</td>
</tr>
<tr>
<td></td>
<td>- Provide more in-depth information on demand.</td>
</tr>
<tr>
<td></td>
<td>- Link users to websites.</td>
</tr>
<tr>
<td>Dashboard navigation</td>
<td>- Guide users through your workbook.</td>
</tr>
<tr>
<td></td>
<td>- Direct users to additional content.</td>
</tr>
</tbody>
</table>

When designing dashboards, consider how and why you incorporate interactivity into the dashboard. The following questions are helpful:

- Why does a viewer need to interact with the dashboard?
- What extra insight will be gained through the interactivity?

**Designing for performance**

When we talk about performance, we mean the speed with which you can work in Tableau. That might mean the speed of data analysis: for example, if you work in Tableau Desktop on a large corporate database that takes forever in real time when you access it remotely. Or it might
mean simply the speed of loading views or dashboards that you access on your desktop or from Tableau Server.

Performance and efficiency should be treated as part of the design process, not as an afterthought. Responsiveness is an important success factor for end users when viewing reports and dashboards, so making your workbooks run as quickly as possible makes for happier users.

There are several factors that make a workbook “efficient”. Some of these factors are technical and some more user-focused but in general an efficient workbook is:

- **Simple** – Is it easy to create the workbook and will it be easy to maintain in the future? Does it take advantage of the principles of visual analysis to clearly communicate the message of the author and the data?
- **Flexible** – Can the workbook answer multiple questions the users want to ask, or just one? Does it engage the user in an interactive experience or is it simply a static report?
- **Fast** – Does the workbook respond quickly enough for the users? This may mean time to open, time to refresh or time to respond to interaction. This is a subjective measure, but in general we want workbooks to provide an initial display of information and to respond to user interactions within seconds.

The performance of a dashboard is affected by the following:

- The visual design at both the dashboard and worksheet levels, e.g. how many elements, how many data points, use of filters and actions, etc.
- The calculations, e.g. what kind of calculation, where the calculation is performed, etc.
- The queries, e.g. how much data is returned, impact of custom SQL, etc.
- The data connections and underlying data sources.
- Some differences between Tableau Desktop and Tableau Server.
- Other environmental factors, such as hardware configuration and capacity.

For more information, see [Designing efficient workbooks](#).

**Accessibility**

To make your views accessible to as many people as possible – or if you work in an environment that is subject to US Section 508 requirements or other accessibility-related laws and regulations – you can use Tableau to build data views that conform to the Web Content Accessibility Guidelines (WCAG 2.0 AA). This includes building views that are accessible to users who use screen readers, Braille keyboards, keyboard-only navigation and so on. For more information, see [Build data views for accessibility](#).
Organisational assets

Developing organisational assets – such as a style guide, template workbooks with pre-selected fonts, colours, negative space, etc. – will help your users adopt visualisation best practices. It’s important for creators and viewers to both understand what “great” looks like and have a common reference on how to best develop, deliver and consume content. Your community leaders should work on socialising great content across the organisation and share any assets on your Tableau enablement intranet on page 165.

By providing users with content that looks and feels familiar, you can dramatically speed up adoption. Additionally, you can build consumer confidence by producing content that is recognisable as part of a brand. The core themes to keep in mind when designing your standard are text, colour and consistency.

- Text – Use of text is not limited to custom fonts; it is also about the use of text and lettering to enhance your analytics and storytelling to improve cognitive recognition of analytics.
- Colour – Use custom colour palettes, and capitalise on pre-existing associations to increase speed to insight. In addition, keep in mind best practices regarding colour blindness and limit the amount of discrete colours on a dashboard. If your brand has bright colours, use a neutral colour palette and use your brand’s colours to call out specific items on a dashboard instead of using them as main colours.
- Consistency – Consistency doesn’t mean having to have a set of identical visualisations or dashboards. Think about how to convey the same look and feel while allowing room for design and creativity.

Before creating your corporate-branded standard, remember that you should never compromise efficient analytics for design or stylistic elements. While some design elements can actually increase analytic value, you should never make something that looks good at the expense of performance or functionality.

Visual style guide

Do your users know what a great dashboard looks like? By publishing a visual style guide, you will give your users a start on design, as well as guidance on how to differentiate between ad-hoc and certified content, which fonts and brand colours to use, and formatting options. This style guide can be a document or a Tableau workbook.
Dashboard layout template

Dashboard layout templates help creators to assemble polished dashboards by adding their individual sheets into predefined layout containers. You can download sample dashboard layouts from Tableau Public and customise them with your own logo and colours.

Dashboard layout

Dashboard review checklist

You wouldn’t distribute documents to stakeholders without the proper review, revision and release processes. Dashboards are no different. Dashboards need to reviewed and validated before they are promoted and certified.

The first person to validate content should be its author. Authors should solicit feedback from the target audience as well. This can be done in an informal feedback group or by sharing a link to the workbook and encouraging comments. No dashboard is right the first time. Time and collaboration are ideal ways to hone in on the best representation of your data. Other people’s opinions will bring fresh perspectives. Consider the following:

- What type of formal or informal means do we need to gather feedback?
- How can we encourage a constructive conversation?
- Has there been time spent on gathering feedback, improvement and iteration?

Create a dashboard checklist to help users apply visual best practices and a consistent design with a style guide. Every content creator should apply the checklist of your organisational standards to their work before sharing it with others.
Data stewards should also play a role in ensuring correctness and review an embedded data source as a potential candidate for publishing and certifying. Beyond data and calculation correctness, content validation should also include a review of the branding, layout, formatting, performance, filters, dashboard actions and edge case behaviour by the site administrator or project leader.

**Metadata checklist**

The metadata checklist below shows best practices for curating a published data source as outlined in Tableau governance on page 27. By establishing data standards using the checklist, you'll enable the business with governed self-service data access that is user-friendly and easy to understand. Prior to creating an extract or published data source in Tableau Server, review and apply the following checklist to the metadata model:

- Filter and scale to the analysis at hand
- Use standard, user-friendly naming conventions
- Add field synonyms for Ask Data
- Create hierarchies (drill paths)
- Set data types
- Apply formatting (dates, numbers)
- Set fiscal year start date, if applicable
- Add new calculations
- Remove duplicate or test calculations
- Enter field descriptions as comments
- Aggregate to highest level
- Hide unused fields

**Presentation guidelines**

The last mile of analysing data is taking insight and communicating it to others. Regardless of the data skill level, people should be able to show a dashboard and clearly articulate a data-driven message in a meeting or a presentation. Designing charts for presentation requires special considerations because a complex chart that works for you on your laptop screen won’t work in a presentation.
When sharing some insight, consider the key purpose of the chart. What is the main message? In the example below, the chart shows malaria cases in Zambia following work by the global non-profit organisation PATH. The key message is the 93% reduction in cases; notice how that is stamped on the slide very clearly.

![Chart showing malaria cases in Zambia](image)

**93% reduction in malaria cases**

Stated conclusion with visualisation

Think about how long the chart will be on the screen for. While you might intimately understand the chart, your audience will be seeing it for the first time. If you want to show a complex chart, you must take the time to explain it. The malaria example above can be understood in moments because of the visual and stated conclusion. A good rule of thumb is that a chart should be understandable by your audience in less than half the time it is on the screen.

Your audience needs to be able to read the relevant parts of your chart. The default fonts are very small because they are designed for consumption on a laptop/monitor. These font sizes don’t work on big screens. Two version of the same chart are shown below. The chart on the right has fonts large enough for everyone in the room to read.
Legend incorporated into visualisation

You should use colour very wisely to highlight your message. Imagine you are tracking customers by day of the week, and you want to highlight that weekends have far fewer customers than weekdays. The chart on the left (below) most effectively conveys that message. It uses a simple colour scheme to convey an insight much more clearly than the one on the right.

Colour used for emphasis vs. too much colour

Before you present your insights in charts, consider the following:
Have you added state conclusions to tell the story in the data?
Can the fonts be read from the back of the room you will be presenting in?
Is colour used for highlighting your message rather than decoration?
Is the chart simple enough to understand during the time it will be on the screen?

The main takeaway is an appreciation that a dashboard or complex analytical chart designed for desktop screens is almost never the appropriate choice when sharing insights in meetings or presentations.
Tableau communications

When you deploy Tableau broadly across your organisation, establishing internal communications and enablement resources promotes adoption in order to scale data and analytics more efficiently. Our most successful customers use a variety of self-service help methods to get started with Tableau, answer frequently asked questions and locate other Tableau users within the company.

This topic outlines the enablement intranet, discussion forums and newsletters to assist the analytics sponsor and community leader. Depending on what works best for your company, the list of topics below showcases the many ways you can communicate with your user community. With a well-defined communications plan, you will build your user community, nurture the use of data and analytics across all skill levels, and minimise the resources needed to answer common questions.

Tableau enablement intranet

As your deployment grows from hundreds to thousands of users, it can be difficult for users to connect with one another. The enablement intranet allows numerous users to connect across departments and geographic locations. It will serve as the hub for all Tableau resources with the goal of creating a consistent user experience and helping everyone form new habits based on best practices.

The following sections define topics you can publish on your intranet that will allow your user community to quickly and easily find information about onboarding, governance policies and procedures, other Tableau users, and more. By sharing this information proactively, you’ll get ahead of the questions and lower the barriers to providing governed, self-service analytics. An example site map is shown below:
Getting started

When a new user is interested in a licence, who do they contact? What do they need to know to start using Tableau? What resources are available? As Tableau is deployed broadly across your organisation, if you’re the only one trying to onboard every user, there will be trouble ahead. As more users adopt Tableau, it becomes more difficult to effectively manage and support the user community because there aren’t enough resources to provide one-on-one assistance.

The “Getting started” area connects new users with necessary resources on your intranet and throughout the company. Get users over the hump and on to using Tableau instead of struggling. This is the first step in empowering users and building your organisation’s Tableau community.

Think of the common questions you might get:

- How do I obtain a licence and install software or access Tableau Server?
- What are the basic skills for each licence level? (detailed below)
- When is training and what is needed for my corresponding role?
- Who is using Tableau in my department?
- How do I connect to data?
- What certified data sources are available?

Additionally, publishing links to Tableau’s online help topics will help to set the baseline skills for viewing and interacting with data:

- Sign in to Tableau Server or Tableau Online
- What can I do with a Tableau site?
Tableau Blueprint help

- What can I do with a Tableau web view?
- Explore and analyse data in a view
- Use custom views
- Share web views
- Subscribe to views
- Send data-driven alerts
- Comment on views

For Creators and Explorers, provide the following links:

- Web authoring and Tableau Desktop feature comparison
- Creators: Get started with web authoring
- Creators: Connect to data on the web
- Prepare data on the web
- Edit views on the web
- Connect to published data sources while web editing
- Create a dashboard
- Create a story
- Save your work

FAQ

Maintaining an FAQ will help users quickly and easily answer common questions, as well as save you time from not having to directly respond to every question.

Support

In the support area, define where a user should go for assistance, including peer-to-peer assistance, office hours and logging a support ticket. If a user cannot find the help they need, then they are more likely to become frustrated with the situation and not continue using Tableau. Establish and document an escalation path for tickets in case a question cannot be answered by an expert within the user’s team or department. For more information, see Tableau support processes on page 183.

You should also take advantage of Tableau’s online help and Knowledge Base by publishing links to common help support topics: Tableau Desktop and Tableau Prep Builder. On these
pages, you'll find a list of popular topics that you can curate on your enablement intranet's support page.

**Announcements**

Post announcements on the enablement intranet to communicate everything from user group meetings, learning plans, training opportunities and office hours to maintenance windows, upgrades and other service-impacting events.

**User directory**

Creating a user directory makes people discoverable, promotes the exchange of ideas, helps users find others in or outside of their team for assistance, and builds your user community. The user directory should include every licensed Tableau user, with their name, department, title, licence level, skill belt level and certification level.

A list of licensed Tableau users can be obtained from the Tableau Server Community TS Users data source and joined with HR, training and certification data to provide a complete profile of each user. Alternatively, the **Tableau users on page 15** tab of the **Tableau Blueprint Planner** will also include this information and can be used as the data source to create the list. Use Tableau to create the view and embed it in the web page.

**Governance models**

Combining people, processes and technology informs users who put your company’s **Tableau governance models on page 59** into practice. Help your users understand the centralised, delegated and self-governing models of data and content governance, which were established with the Tableau Blueprint Planner’s governance worksheet, by publishing guidelines, policies and processes. Users need to understand and reference your organisation’s workflow regarding data source certification and content promotion for everything from sandbox to production projects.

**Data platforms**

Your company's sources of data should be listed so that users know where to go for what kind of data. Document the database name, table or view, type of authentication and access request requirements on each one.
Certified data source directory

To help users understand what trusted data is available to them and more quickly find a governed dataset for their analysis, create a certified data source directory. The certified data source directory lists curated, governed data sources. At a minimum, it should include the data source name, owner and the source of the data. Since one department’s data can be helpful context for another department, consider sharing all certified data source names in the directory to increase awareness around availability while also minimising the possibility of duplication.

Certified data sources can be obtained from the Tableau Server Community TS Data Connections data source by filtering on [Data Source is Certified] = TRUE. Use Tableau to create the view and embed it in the web page.

Analytics best practices

With analytics best practices readily available on the enablement intranet, content authors will have guidelines for choosing the right chart type and creating effective, actionable dashboards for content consumers. For more information, see Analytics best practices in Tableau on page 139.

Visual style guide

Do your users know what a great dashboard looks like? By publishing a visual style guide, you will give your users a head start on design, as well as guidance on how to differentiate between ad-hoc and certified content, which fonts and brand colours to use, and other formatting options. Often the best place to start defining a visual style is your corporate brand or style guide. Post a custom colour palette and layout template in this area. For more information on branded layout templates, see Analytics best practices in Tableau on page 139.

Inspiration

You can embed Tableau RSS and/or Twitter feeds in an intranet page to deliver current content directly from Tableau to your user community. Tableau provides RSS feeds for Tableau Public’s Viz of the Day gallery and Tableau blog, which can be consumed with an RSS viewer web component. Similarly, the Tableau (@tableau) and Tableau Public (@tableaupublic) Twitter feeds can be embedded on your intranet by using Twitter’s embedding page.
Events calendar

Building an events calendar based on engagement activities outlined in Tableau community engagement on page 175 and Tableau support processes on page 183 can assist your users with engagement and adoption. These activities include user group meetings, admin group meetings, lunch-and-learn events and office hours.

Learning plans

To help users understand the skills needed for their job function and licence type, publish learning plans for each of the roles: Site admins, project leaders, Creators, Explorers, and Viewers. For more information on learning plans, see Tableau education on page 113.

Training videos

All videos, transcripts and related files may be downloaded in bulk and curated in your organisation's learning management system (LMS) or published to your enablement intranet. In-house trainers may supplement the free training materials offered by Tableau with their own practice exercises or data sets relevant to your organisation.

Company education calendar

The company education calendar has recurring meetings for site admin-, project leader-, Creator-, Explorer-, and Viewer-focused training sessions that will be held in a web meeting or a classroom. Holding these sessions monthly or even weekly, especially when first starting out, will provide everyone with the information they need to begin using Tableau. For more information, see Tableau education on page 113.

User group recordings

By recording your internal user group meetings, you can make them available to anyone who was unable to attend in person. They can serve as a useful reference for training new users as well.
Tableau blog and newsletter

Publish an analytics blog to showcase achievements and provide awareness and recognition of how data and analytics are used within your organisation. Departments can submit highlights of their work and upcoming events can be promoted. Other topics might include documented value, Tableau tips and tricks, enterprise-scope data source availability, and communication of downtime/upgrades. Alternatively, you can distribute an analytics newsletter via email.

Tableau discussion forums and chat

Discussion forums and other chat-based communications provide users with information in real time. These methods can also become a knowledge base, as archived chats may answer questions that will arise in the future. Set up a Tableau discussion forum, chat room and/or channel (Slack, Yammer, etc.) and invite all your Tableau users to join.

Depending on the systems used by your company, both discussion forums and chat are incredibly helpful to community managers to determine topics that may need more attention in training or with engagement activities. In forum-style discussions, questions and answers can be categorised by topic to improve future searches. For channel-based communications, you can achieve a similar result with a channel per topic or a single help channel for all questions. Either way, facilitating these connections between users will make your community stronger.

Getting started

Building your own community spaces can be challenging, but once started, it will serve as a virtual rallying point for your users. The below methods can be used to help you set yourself up for success:

- Community champions: A committee or team of Tableau experts can be a voice for your users and shape the way your forums are set up based on their needs. Keeping this group diverse will ensure you plan for the needs of all your users.
- Types of resources: Which topics are most important to your users? How do they prefer to consume content? What is the frequency at which you should deliver content? Answering these questions can get you started on creating content that is right for your user base. Your community champions should be involved in this planning phase.
- Encourage self-service help: A key benefit of community spaces is the ability for users to solve their own problems and issues through the expertise of others. By setting service
level agreements on response times to chat messages or posts, you can give your community users confidence that they will not go unheard.

- **Roles & responsibilities**: A successful community can quickly grow to touch all aspects of an organisation. Make sure the roles of the team who will be managing your internal forums are clearly defined. Examples of discussion forum and chat roles are:
  - Admins: monitoring the overall health & performance of the forums
  - Moderators: answering questions and engaging with forum users
  - Ambassadors: those who serve as champions and face of the forums
- **Be realistic**: Set expectations for your forums early in terms of engagement, what types of content you will need and who owns what.
- **Start small**: Build for what you need and plan for the future. Your forums may start small, but they won’t stay that way.

### Building your forum

When setting up your own forums and chat spaces, keep in mind some of the best practices below:

- **Platform**: Look to company standards for chat- and intranet-based applications that work within your organisation. This can be anything from your Tableau enablement intranet on page 165 to a chat-based application. The important thing is that your users know where to go to connect with other Tableau users, outside of regular Internal Tableau activities on page 175.
- **Easy-to-find resources**: Create distinct spaces for your users to quickly find resources such as getting started with Tableau, advanced calculations and employees who can offer guidance. Setting these spaces up early and populating them with content will keep your users coming back to your internal spaces.
- **Categorisation**: Set up chat channels or tag forum posts with specific topics to improve content searchability. As your community grows, so will the content. Make sure your users can quickly and easily find what they need.
- **Internal moderators**: Identify a group of power users who can help moderate the forums by answering questions, creating content and onboarding new users. These individuals should also be Tableau experts who can help guide your users through even the most challenging questions.
- **Use the data**: Keep track of how users are interacting with the forums and what topics are most popular. This will guide you in developing the right content and forum engagement plans for your users, as well as identify content for regular Internal Tableau activities on page 175.
Tableau Blueprint help

Through careful planning, your discussion forums and chat spaces can become a tremendous resource for driving adoption of Tableau within your organisation.

Learn from Tableau!

Use the Tableau forum resources below for inspiration on how you want users to interact with your forums and the types of guides you can create:

- Tableau forum guidelines
- Attaching a workbook
- @ mention etiquette
- Community etiquette
- Code of conduct
Tableau community engagement

Your organisation’s Tableau user community is just like the Tableau community – only on a smaller scale. You should connect users within your company and generate enthusiasm among a group of people founded on the common cause of putting data at the centre of every conversation. While building excitement around the use of Tableau, engagement activities accelerate and reinforce the vision for modern analytics and ultimately, fuel your organisational transformation.

Engagement activities are used to create and nurture an environment for more productive, results-driven people who will use facts over intuition to make business decisions. People will collaborate with each other and share their product knowledge and business domain experience across a wide range of skill levels and across different teams and departments, who may never have exchanged ideas before.

Engagement activities should include something for everyone, offering a variety of activities that appeal to different skillsets and are delivered in different formats, from in-person to virtual, both inside and outside your company. Whether hosted by your company’s community leader, other Tableau customers or Tableau Zen Masters and ambassadors, there are a variety of formats to invite users to learn, collaborate and network to increase their Tableau skills.

Internal Tableau activities

Hosted within your company, internal engagement activities are organised by a community leader, following a regular schedule or events calendar that is published on your enablement intranet or wiki and promoted through other communication channels. The following activities will be covered in this section:

- User group – Open to all Tableau users to promote collaboration and sharing between teams
- Champions group – Open to all identified champions to exchange ideas
- Admin group – Open to all Tableau Server and site administrators to review server and content usage and exchange administration ideas
- Lunch & learn – Lunchtime meetings focused on building a new skill
- Viz games – Data-analysis competition
Tableau user group

Internal user groups can take different shapes depending on your organisation’s size and geographical distribution, but one thing is certain: every Tableau user is invited to participate. This also includes server and site administrators. It may start with just a few people, or it could be hundreds across the organisation. During user group meetings, people can openly share information across different teams and departments. Regardless of skill level, it’s a great way for everyone who attends to learn, network with other users and exchange fresh perspectives on solving business problems with data.

A strong internal user group starts with a strong leader. It is their passion and attention that will fuel and inspire the rest of the group. The community leader should schedule a regular, recurring monthly meeting time and promote it on the enablement intranet. Don’t be discouraged if attendance numbers aren’t high initially. When relevant topics are put on the agenda, people will attend because they know valuable information will be shared. If possible, record the meetings and archive presentations on the enablement intranet so that new users can benefit from on-demand viewing. A sample user group agenda is shown below:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome/announcements</td>
<td>Welcome attendees and share announcements such as new help topics on the intranet, training sessions, etc.</td>
<td>10 mins</td>
</tr>
<tr>
<td>Skill development</td>
<td>Select a topic to help attendees learn a new skill (such as product skills) or demonstrate design best practices from internal or Tableau Public content.</td>
<td>15 mins</td>
</tr>
<tr>
<td>Success story</td>
<td>Share an achievement that was made using data.</td>
<td>10 mins</td>
</tr>
<tr>
<td>New certified data sources</td>
<td>Highlight new certified data sources that have</td>
<td>5 mins</td>
</tr>
</tbody>
</table>
Tableau Blueprint help

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top content recognition</td>
<td>Showcase the top 10 dashboards in the company.</td>
<td>5 mins</td>
</tr>
<tr>
<td>Open feedback</td>
<td>Allow time for open feedback and Q&amp;A.</td>
<td>15 mins</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60 mins</td>
</tr>
</tbody>
</table>

Meeting topics should be tailored to suit users’ needs. Information gathered from the Data & analytics survey and Users tabs in the Tableau Blueprint Planner will provide initial guidance on what skills exist versus which skills need to be developed among the user community.

For existing deployments, Tableau Server and/or site administrators will be able to provide more information about user behaviour from the Tableau Server Repository, such as content utilisation and the availability and use of published and certified data sources, subscriptions and data-driven alerts, as outlined in Tableau monitoring on page 91 and Measurement of Tableau user engagement and adoption on page 127. As an example, if there are only a few certified data sources available, you can hold a session on how to publish and certify data sources and discuss the value of curated, governed data models. Similarly, if users are not subscribing to dashboards or setting data-driven alerts, you can encourage users to take advantage of these features by explaining how to subscribe or set an alert.

Tableau champions group

Champions are part of a programme to recognise people in your analytics community who contribute significantly by connecting, collaborating and sharing with others because they recognise the value of helping their peers see and understand data. Characteristics of a champion are listed below:

- Leadership and evangelism
  - Represents the spirit and voice of the community: inclusive and kind.
  - Teaches by their actions and encourages good behaviour within the community.
- Knowledge and advocacy
  - Has a fair understanding of the Tableau product, company and/or community.
  - Is active in the community.

- Responsive and accessible to others in the community
  - Responds and engages with others regularly in regards to Tableau.
  - Collaborates and contributes where possible.

Champions should meet as a group to share what they are hearing and seeing from users to feed into community-wide enablement activities, representing the Tableau community within your organisation.

**Tableau admin group**

The admin group is a subset of the user group, consisting of Tableau Server and site administrators only. Admin group meetings should occur monthly to exchange ideas, share challenges and identify how changes will be communicated. In organisations with multiple Tableau Server instances, having a Tableau Server admin group will help to coordinate standards and upgrades, as well as tackle common challenges. A sample administrator group agenda is shown below:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome/announcements</td>
<td>Welcome the admins and share announcements.</td>
<td>10 mins</td>
</tr>
<tr>
<td>Server utilisation review</td>
<td>Review server hardware utilisation, background tasks, user onboarding schedule.</td>
<td>15 mins</td>
</tr>
<tr>
<td>Content utilisation review</td>
<td>Review content utilisation, slow-loading dashboards, long-running extracts, stale content.</td>
<td>20 mins</td>
</tr>
<tr>
<td>Open feedback</td>
<td>Allow time for open feedback and Q&amp;A.</td>
<td>15 mins</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>60 mins</td>
</tr>
</tbody>
</table>
Tableau Blueprint help

Tableau lunch & learn

It’s often challenging to schedule time during a busy workday, but everyone has to eat. Lunch-and-learn events are an informal option to help users learn from each other. Schedule a monthly lunchtime meeting where people can bring their food in and listen – or, if possible, even arrange for food to be brought in. This will definitely increase your attendance rate.

Tableau viz games

Viz games is a visualisation competition where a sponsor issues a visualisation challenge, a data set prepared for analysis and a deadline for publishing submissions, typically one week or more into the future. Live contests, where contestants compete in a race to submit visualisations before the clock runs out, are exciting, but more complicated to run. At Tableau, both formats are used. The online contests determine who is eligible to compete in the final, in-person contest.

Selecting a theme up front helps guide the rest of the competition. Themes for viz competitions are typically around a particular topic, dataset, chart/dashboard type or feature. Get creative and challenge the participants in a way that is fun and engaging!

Executive sponsors may tie the contest back to a strategic initiative to motivate contestants around a common cause or business problem. Allow cross-functional teams to form and solve the problem by bringing together a Tableau champion, a data expert and a business domain expert. For example, the company has a $45 million savings target. Finance provides accounts-payable data and contestants are asked to design a dashboard to identify potential savings areas.

Judging panels can be a group of people with diverse experiences and perspectives to make for a balanced evaluation. The panel should evaluate submissions on the following areas:

- Analysis – Review the question(s) that are being asked and the insights the viz provides. In more detail, look at the type of data used, the type of charts used, the type of aggregation and statistical analysis used. How sophisticated and appropriate for the story, or question being answered, are these analyses?
- Storytelling – See whether the context of the topic and questions being posed are clear. Is it clear how one moves through the viz and from question to answer? Does it highlight what is interesting and why it matters? All of that can be done in different ways, using colour/shape/size, text, images, annotations, story points, etc.
• Design – Evaluate the visual appeal, layout and flow, use of whitespace (or lack thereof), and colours and images. How polished is it? How appropriate is the design for the story that is being told?

Use a scoring sheet to record values and feedback:

**Viz and link Analysis (0-10) Storytelling (0-10) Design (0-10) Feedback**

Recognition, no matter how small, is motivating. Give out prizes for simplicity, for guided analytics, for creativity and even for obscure insight.

**Tableau Day**

To raise the visibility of data and analytics within your company, schedule a Tableau Day one or two times a year. The event can be like a miniature Tableau Conference for your company where presenters share their work and insights. Coordination with executive sponsors and achievements made on strategic initiatives are a great way to emphasise the transformational power of data and analytics.

Tableau can provide speakers who lead the attendees through demos, hands-on training and Q&A. Having a Tableau resource on-site – or more than one – is a guaranteed way to attract other users. Working with your Tableau account manager to set up a Tableau Day is a fantastic method to generate excitement and build momentum across the organisation.

**Analytics day**

An analytics day is similar to a Tableau Day, but the scope expands to include subjects other than Tableau. Expanded topics like systems modernisation and database platforms can be combined with Tableau content for a broader showcase of the use of analytics and advances being made with data.

**External Tableau activities**

External activities outside your company are organised by Tableau or Tableau Community leaders. You should encourage users to attend these activities as well. For a full list of
scheduled community events, visit **Events and conferences**. The following external activities are covered in this section:

- **Area Tableau User Group** – Customer-led sessions held in major cities around the world
- **Virtual Tableau User Group** – Online meetings hosted by customers or Tableau
- **Community-hosted activities** – Online meetings with a skill-building focus
- **Tableau community forums** – Places to join discussions, browse topics, ask questions and share insights
- **Tableau roadshows** – Tableau-hosted events in coordination with product launches
- **Tableau Conference** – Annual customer conference held in both the US and Europe

### Area Tableau User Group

A Tableau User Group is a customer-organised event that creates a place for users to learn, collaborate and network. With over 250 worldwide, Tableau User Groups are organised by geographical regions and are most commonly held at office spaces or universities. Hosting a Tableau User Group is beneficial to both the host and attendees: it’s free on-site training for employees and great exposure for creating visibility in the community!

### Virtual Tableau User Group

*Industry user groups* are often run by customers. Here, more people are able to connect with their peers in 14 active industry groups: Server admin, healthcare, government, primary and secondary education, law, retail, data + women, non-profit, insurance, higher education, OEM partners, travel & hospitality, manufacturing, and loss prevention.

### Tableau community-hosted activities

Run by Tableau Community leaders and Zen Masters, Tableau Community-hosted events inspire others, demonstrate different ways to solve problems and offer different perspectives for applying Tableau. This is in no way meant to be an exhaustive list.

*Makeover Monday* is a weekly learning and development session hosted by Tableau Community leaders and Zen Masters. With participants from around the world, they start with a given data set and create better, more effective visualisations.

*Workout Wednesday* shares a set of weekly challenges. The challenges are designed to test your knowledge of Tableau and help you grow your Tableau skills. Participants are asked to
replicate the challenge as closely as possible. When you think you have it, leave a comment with a link to your visualisation and post a pic on Twitter for others to enjoy.

Think Data Thursday is an online user group that meets once a month – give or take – on Thursdays. The Tableau Community decides what will be discussed in each TDT online presentation and discussions. TDT presentations are recorded and available for review at your leisure. In this group, share your thoughts/ideas for future sessions, find recordings and keep an ongoing conversation! To see past meetings, check out the YouTube channel.

Tableau Community Forums

Find answers and help others, connect with other users, and add your voice to future Tableau product releases. Browse topics, ask questions and share your insights. For more information, see the Tableau forum guidelines.

Tableau Conferences

Customers come to Tableau Conferences to learn how to work faster, gain inspiration, network with other attendees and build lasting connections. Whether you’re new to data analytics or a seasoned pro, Tableau Conference has the content you need to kick your skills into high gear. From lectures and hands-on training to collaboration sessions and meetups, Tableau Conference has something for every learning style, including Tableau- and customer-led breakout sessions, training workshops and certifications. The events are held in the US (Tableau Conference) and Europe (Tableau Conference Europe) annually.
Tableau support processes

In addition to the proactive steps you’ve taken with self-service help resources and education initiatives published on your enablement intranet, your user community should be able to request more support in case these two approaches do not answer their question or resolve the issue. If a user cannot find the help they need, then they are more likely to become frustrated and abandon Tableau, which will negatively impact adoption targets.

Like other enterprise platforms, you should define the support escalation path for Tableau, considering the next levels of support that will be available and which team will be responsible for the resolution. Customers have successfully established community-led support by using champion-created content, and escalating to the analytics or IT team for system-level issues, such as server and database access. Log and categorise these requests to analyse the support data and identify opportunity areas for new content on the enablement intranet, user group topics and educational needs. Additionally, there are a number of self-help resources provided by Tableau:

- **Knowledge Base** with step-by-step instructions for resolving problems
- **Tableau Community** forums to find answers from other Tableau users worldwide
- **Support hub** with alerts, drivers, release notes, known issues and FAQs
- **Tableau Trust** for the current status of Tableau Online and Tableau Public
- **Twitter support** with updates, trending technical support issues, popular KB articles and more

Through a variety of interactions, you need to support your user community, encourage collaboration and remove the obstacles to using data and analytics effectively. This document outlines the tactics to develop Tableau champions, connect people with peer-to-peer assistance and define the support escalation path.

Tableau champion development

Residing within each team or department, champions see the transformational value of Tableau and possess the skills necessary to maximise the impact of data and analytics using visual best practices in their business domain. Initially, this starts with the content creators who are part of the project team, but as the deployment expands to new departments and teams, new champions will need to be developed to scale your analytics practice.
Champions are a key part of the adoption process because they reduce the dependency on a centralised support team. They will connect users who are analysing similar data and identify cross-functional collaboration opportunities across the organisation. By involving champions in new user onboarding within their department or team, champions will help to orient those who are new to Tableau and promote the use of data and analytics for making business decisions. Being on the front lines of applying Tableau to make data-driven decisions, champions will provide valuable input to community communications and engagement activities to optimise your organisation’s analytics practice.

Because champions will be recognised as experts, you should prioritise and invest in developing their skills prior to beginning a company-wide education initiative and support their continued learning. Depending on the size of your user community and the bench strength for analytical skills, you will choose an approach that’s appropriate for your organisational needs. Ensure you are clear on the scope and responsibilities needed to fulfil the role, obtain management approval for the time champions are committing, and recognise and reward their contributions to support others. Two examples are detailed below:

- **Department/team Tableau champions** – Champions are identified within departments or teams and functional or geographic areas. They will have both Tableau and business domain data expertise to help others institutionalise analytics best practices as outlined in [Analytics best practices in Tableau](#) on page 139. They should also review user engagement with the site administrator as defined in [Measurement of Tableau user engagement and adoption](#) on page 127 to quantify the impact of their contributions.
- **Tableau community champions** – Champions are identified across the user community for the value they add to the community through sharing best practices, helping new users and assisting users create or make over their dashboards. They should assist the community leader in coordinating relevant communications and engagement activities as outlined in [Tableau communications](#) on page 165 and [Tableau community engagement](#) on page 175.

**Peer-to-peer assistance**

With peer-to-peer assistance, you encourage others to share and transfer their Tableau knowledge. This allows your user community to make use of the collective brainpower of the entire organisation. This section outlines Data Doctor, mentoring, and discussion forums and chat.
Tableau Data Doctor

The Data Doctor toolkit is a collection of resources for organising and hosting your own help sessions where members of your analytics team and/or champions assist other Tableau users. Data Doctor fosters engagement and enablement by connecting your Tableau experts with their colleagues who have questions or need help using Tableau in live, one-on-one sessions. Organisations have used Data Doctor to provide peer-to-peer support and training, as well as to identify individual, departmental or organisational knowledge gaps. For more information, see Tableau community toolkit.

Mentoring

With mentoring, experienced Tableau users share their knowledge with others. Champions should take a lead role in onboarding within their teams or departments by mentoring new Tableau users, introducing available data sources and providing informal check-ins to grow the analytical skills of their team members. Using data from Measurement of Tableau user engagement and adoption on page 127, champions can partner with server or site administrators to see which users are creating and consuming content and to determine who might need more encouragement.

Tableau discussion forums & chat

Discussion forums and other chat-based communications can provide users with information in real time. These methods can also become a knowledge base, as archived chats can answer questions that will arise in the future. Set up a Tableau discussion forum, chat room and/or channel (Slack, Yammer, HipChat) and invite all your Tableau users to join.

External Tableau Community forum

The Tableau Community forums are a source of information for answering Tableau-related questions. Chances are that if users have a question, someone else has asked it in the past or will have the same issue in the future. This community of Tableau users learn, teach and share ideas with each other so that the knowledge within it is continually growing.

To get started, review the Tableau forum guidelines and Packaged workbooks: when, why, how. Visit this page to create your Tableau account and get started.