

# Notifications, Monitoring, and Tuning



So you've finished setting up users and extracts and Tableau Server seems to be humming along---now you can relax, right? Almost. This chapter describes how to monitor the health of Tableau Server. In theory, the steps in this chapter are optional: you don't *have* to set up notifications or keep your finger on the server's pulse. But we really recommend that you spend the effort to do so, because it will go a long way toward ensuring that things keep humming along and will provide useful information that you can use to tune server performance.

## Alerts: Get notifications for server events

Alerts are email notifications that you receive when something happens on [Tableau Server]. You can set up alerts for when the server is running out of disk space and for when server processes stop or start. These conditions often mean that there is an immediate problem.

**Note:** We discuss alerts in this section as a tool for getting information about server health. But as an entirely separate benefit, users can also make use of alerts. After you set up alerts, your users can subscribe to views to periodically receive a snapshot of views they are interested in on a recurring basis.

To send alerts, [Tableau Server] must connect to a mail server, also known as a Simple Mail Transfer Protocol (SMTP) server. An SMTP server is a service that you can send outbound email messages to. It then relays the messages to whoever they're addressed to. (It doesn't handle incoming email.) To set up alerts, you must configure [Tableau Server] to communicate with your SMTP mail server.

### SMTP information you'll need

Many organizations already have an SMTP server in-house. Before you continue, ask your IT department if there is an SMTP server that you can use.

Here's the SMTP server information that you need from your IT department:

- The server address. This is often something like `smtp.example.com` or `mail.example.com`, but other addresses are also possible.
- The port. This is 25 for most servers.
- A user name.
- A password.

Some servers don't require a user name or password because they are only meant for internal use.

You'll also need to decide on a **from** address for the alerts that the server sends. When people receive an alert email from [Tableau Server], this is the name that's on the **from** line of the message. Because alerts are simply informational, you generally don't need to worry about who's on the **from** line, so people use addresses like `no-reply@example.com` or `tableau-admin@example.com`.

### Step 1: Configure SMTP information for Tableau Server

1. Open TSM in a browser:

`https://<tsm-computer-name>:8850`. For more information, see [Sign in to Tableau Services Manager Web UI](#)[(Link opens in a new window)].

2. Click [Notifications] on the [Configuration] tab and click [Email Server].
3. Enter the SMTP configuration information for your organization:

## Notifications

Configure Tableau Server to send email notifications about critical events, processes and server health. Email notifications must be sent through an email (SMTP) server. [Learn More](#)

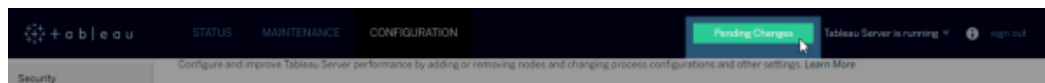
### Email Server Events

#### Configure email server

Tableau Server must connect to an email server using SMTP (Simple Mail Transfer Protocol) to send email notifications. Contact your organization's IT department to determine what SMTP information you need to configure Tableau Server to send email configurations. [Learn more about configuring SMTP for Tableau Server.](#)

SMTP server address	<input type="text" value="smtp.example.lan"/>
Username	<input type="text" value="tableau-notify@example.lan"/>
Password	<input type="password" value="....."/>
Port Number	<input type="text" value="25 (Default)"/>
Type an email address that all emails will be sent from (example: no-reply@example.com)	
Send all emails from	<input type="text" value="no-reply@example.lan"/>
Type email addresses, separated by a comma, that will receive Tableau Server health emails. Tableau Server health emails are typically sent to server administrators or other IT admins.	
Send server health email to	<input type="text" value="tableau-health@example.lan"/>
Choose a footer link to embed in all email alerts and subscriptions. This link is typically the sign-in page of Tableau Server.	
Tableau Server URL	<input type="text" value="https://tableau.example.lan"/>

4. Click [Save Pending Changes] after you've entered your configuration information.
5. Click [Pending Changes] at the top of the page:



6. Click [Apply Changes and Restart].

## Step 2: Set up notifications

1. Open TSM in a browser:

<https://<tsm-computer-name>:8850>. For more information, see [Sign in to Tableau Services Manager Web UI](#) [\(Link opens in a new window\)](#).

2. Click [Notifications] on the [Configuration] tab and click [Events].
3. Configure notification settings for your organization:

**Events**

You can specify which server events will trigger an email notification. We recommend enabling all notifications. [Learn more.](#)

**Content updates**

☒ Send email when flow runs, encryption jobs, or scheduled refreshes fail

☒ Allow users to receive email for views that they have subscribed to

☒ Let users add attachments to subscribed views

**Server health monitoring**

☒ Send emails for Tableau Server process events (up, down, and failover)

☐ Send emails for Tableau Server license reporting

**Drive space**

☒ Send emails when unused drive space drops below thresholds

Warning threshold

20

%

Critical threshold

10

%

Send threshold alert every

60

minutes

☒ Record disk space usage information and threshold violations for use in custom administrative views

Cancel

Save Pending Changes

4. Click [Save Pending Changes] after you've entered your configuration information.

5. Click [Apply Changes and Restart].

If you do select all the check boxes, here are the alerts that get activated.

### Subscriptions to views

Users can periodically receive a snapshot of views that they're interested in. This can be useful if your users want to see information about views on a recurring basis. For example, users can get a view in their inboxes every week.

See the [Additional resources](#) section at the end to read more about how users can set up subscriptions.

### Server component events

For installations of Tableau Server on a single computer (as described in this guide), you can receive a notification when Tableau Server processes stop or start. Because part of the server must be running to send an alert that processes have stopped, you only see notifications when the data engine, repository, and gateway processes stop. However, you see notifications for all Tableau Server processes that start. For installations of Tableau Server on multiple computers, which we're not covering in this guide, this setting also lets the administrator get notifications when individual Tableau Server processes stop responding.

Anytime that server processes stop or that the server restarts unexpectedly, you should investigate the cause of the restart.

For example, you may discover that the Windows Server computer is configured to restart automatically after Windows updates---in which case you may want to schedule updates for off-peak hours.

**Low disk space**

You can receive a notification when the disk space on the server computer falls below a threshold that you specify. As a general rule, we recommend that the server computer maintain at least 20% free disk space. The farther that the disk space falls below this threshold, the more likely that the server's performance will be affected. Eventually, the server may even stop responding.

The defaults we recommend here set email alerts to send hourly when the 20% warning threshold is hit, and sets the critical threshold for 10%.

**Administrative views**

Administrative views are views that are built into Tableau Server and that provide an easy way for you to start understanding activity on Tableau Server---whether the activity comes from users or from server tasks like extracts.

- 1. Sign in to Tableau Server as a server administrator.
- 2. Click **Status**. Tableau Server displays a list of administrative views.

**Analysis**

Dashboards that monitor Tableau Server activity.

Views	Analysis
Traffic to Views	View count, viewers, and viewer behavior for published views.
Traffic to Data Sources	Data source usage, users, and user behavior 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.
Background Tasks for Extracts	Completed and pending extract task details.
Background Tasks for Non Extracts	Completed and pending background task details (non-extract).
Stats for Load Times	View load times and performance history.
Stats for Space Usage	Space used by published workbooks and data sources, including extracts and live connections.

Here are the most important administrative views that you should look at when monitoring Tableau Server:

**Traffic to views**

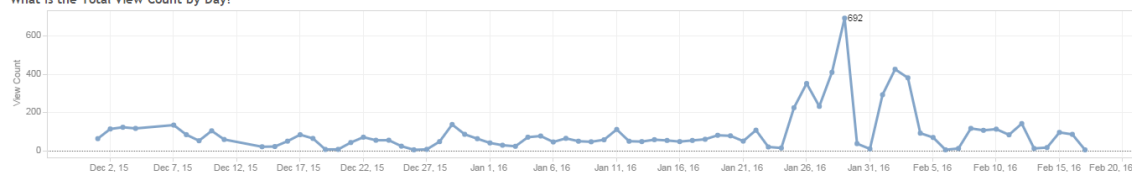
Use this view to identify peak hours for user traffic. (This is easier if you use the Time Range filter. For example, in the screenshot below, the filter is set to **Last 3 months**.) If you know when users need your server most for their work, you can make sure that you schedule things like extract refreshes (which can take up server resources) for when usage is lightest.

For example, in the screenshot, you can see that peak hours are between 1 PM and 3 PM. You can also tell that there is less traffic in the mornings than in the afternoons, and that traffic drops sharply outside of business hours. Conclusion: if this were your data, you'd want to set your extract refresh schedule for the period between 11:00 PM and 6:00 AM.

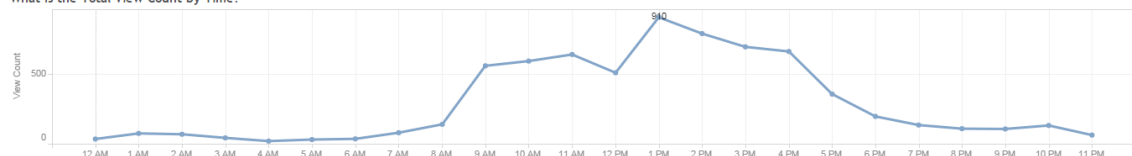
### How Much User Traffic Goes to Views? (Click to filter, see tooltip for more options)

View	Workbook	Time Range	Site	Min View Count
(All)	(All)	Last 3 months	(All)	5

What Is the Total View Count by Day?



What Is the Total View Count by Time?



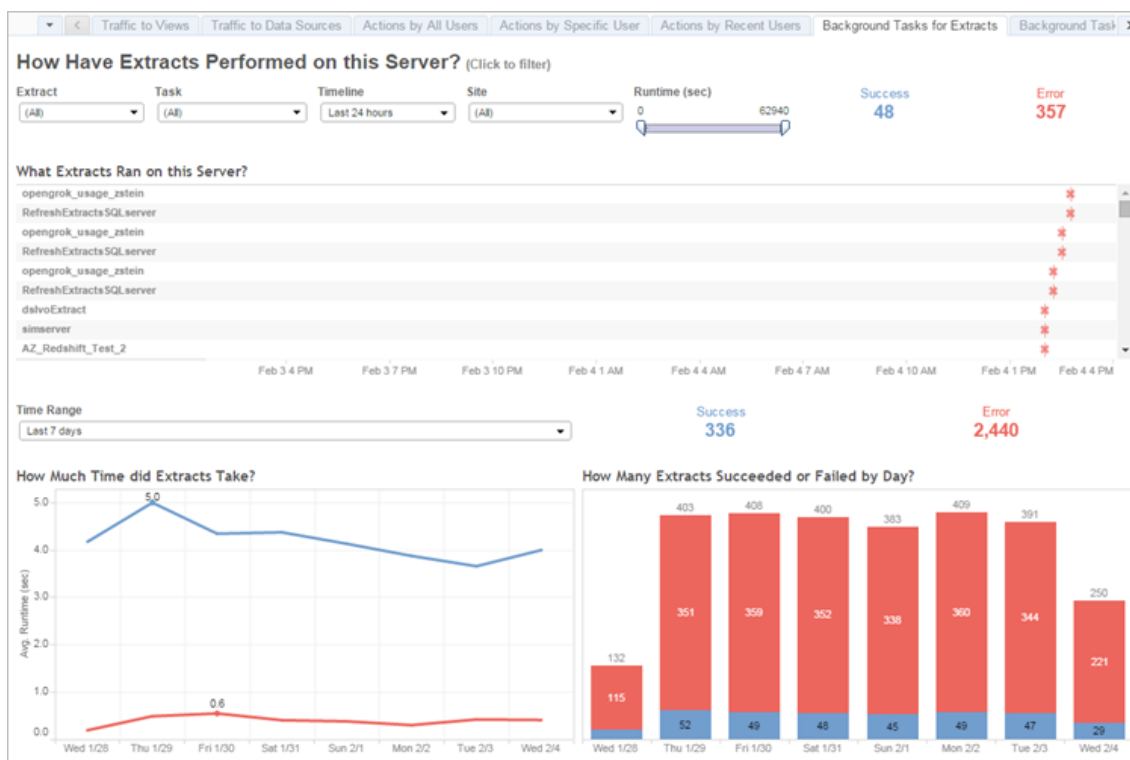
## Background tasks for extracts

Use this view to identify times of the day when extract refresh tasks take longer than usual and to identify extract refresh tasks that did not complete. If there are peak times for extract refresh tasks, distribute the extract refresh schedule so that fewer extracts run at the same time.

Alternatively, if individual extracts are taking a long time, see if you can use Tableau Desktop to reduce the amount of data pulled into the extract---for example, you can sample rows, hide unused fields, and aggregate data for visible dimensions.

If you notice that there are particular extract refresh tasks that do not complete, try to connect to the data source from outside of Tableau Server to confirm that the connection information is correct and that the data source is available.

For example, in the screenshot you can see that many extracts are failing, but you can also see that the failed extracts had very short runtimes. This might indicate that the data source for those extracts is unavailable.



## Stats for load times

Use this view to identify which views are loading slowly. This helps you pinpoint workbooks that are very processing-intensive for the server---inefficient workbooks are one of the most common reasons for poor server performance. (We list some resources later that can help you optimize and troubleshoot workbooks.)

Alternatively, it may be that a view is not processor-intensive but takes a long time to load because of data source constraints.

You can use some of the suggestions we provide later in the [Windows performance monitoring](#) section to see whether there's a spike in CPU usage while a view is loading. If there isn't a spike, the view is not processor-intensive and you should examine the data source. You can also use extracts to avoid making live requests to a slow data source.

For example, in the administrative view below, you can use the exact load times for views to see that the top views load significantly more slowly than the rest.

View:  Time Range:  Site:  Load Time (sec):

What Are the Average Load times for Views?

What Are the Exact Load times for Views?

View Name	Site	Exact Load Time (sec)
Default	Default	51.3
Enterprise/longlist	Enterprise/longlist	52.4
Performance Team	Performance Team	10.6
13.1		13.1
3.4		3.4
7.5		7.5
2.9		2.9
5.0		5.0
5.6		5.6
2.4		2.4
7.1		7.1
2.2		2.2
3.5		3.5
4.6		4.6
2.5		2.5

So far the monitoring information that we've looked at has been gathered by Tableau Server. However, you can also use the Windows Performance Monitor (PerfMon) included with Windows Server to monitor server processes and resource utilization.

The first step in using PerfMon is to set up a data collector set, which is how PerfMon stores the data that it collects. To collect information about Tableau Server processes with PerfMon, Tableau Server must be running when you create the data collector set.

1. Click the Windows Start menu and search for "performance".
2. Right-click **Performance Monitor** and then click **Run as administrator**.
3. In the left pane, click **Data Collector Sets**.
4. In the right pane, right-click **User Defined**, click [New], and then click **Data Collector Set**.
5. In the **Create new Data Collector Set** wizard, enter a name for the data collector set. For example, you might enter **Tableau Server Performance**.
6. Select **Create manually (Advanced)** and then click **Next**.
7. Under **Create data logs**, select **Performance counter**, and click **Next**.

## Step 2: Select performance counters

1. Set the sample interval to 30 seconds.
2. Click **Add**.
3. Select performance counters from the list.

The following table lists some performance counters that we recommend for tracking Tableau Server performance.

Category	Performance Counters	Notes
Logical Disk	Current Disk Queue Length	The number of outstanding write requests and the amount of bytes read and written to the server's hard disk.
	Disk Read Bytes/sec	Select these counters for the disk on which you installed Tableau Server (referred to as the *instance* in PerfMon).
	Disk Write Bytes/sec	
Memory	\% Committed Bytes in Use	The percentage of virtual memory in use, and the amount of memory available in megabytes.
	Available MBytes	
Processor Information	%Processor Time	The percentage of time that the processor spends active, and the percent of processing capacity being used by the processor.
	\% Processor Utility	
Process	\% Processor Time	The percentage of processing capacity being used by a particular process, and the amount of memory reserved for the process. Select these counters for the following processes (referred to as *instances* in PerfMon):
	Private Bytes	
		-
		`run-backgroundunder` (Backgrounder)
		- `run-dataserver` (Data server)
		- `redis-server` (Cache server)
		- `hyperd` (Data



```

|                               | engine) |
|                               | -      |
|                               | `run-vizqlserver` |
|                               | (VizQL Server) |
+-----+-----+-----+

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To select each performance counter:

- a. Double-click to select a category in the drop-down list.
  - b. Select the performance counter or counters that you want to use.
  - c. Under [Instances of selected object], if appropriate, select the process (or instance) that you want to collect information about.
- 
- d. Click **Add**.
  - e. Click **OK** and then click **Next**.

### Step 3: Save the data collector set

1. Browse to the directory where you want to store the data, and then click **Next**.

**Important:** You must store the data in a place that's accessible by Tableau. For example, you might want to store the data on a network drive. If you don't have a network drive mapped, right-click **This PC** and select **Add a Network Location**.

2. Click **Finish**.
3. In the left pane of the main **Performance Monitor** window, select the data collector set that you created.
4. In the right pane, right-click the performance counter **DataCollector01** and then click **Properties**.
5. Select **Comma separated** as the log format and then click **OK**.

### Step 4: Run the data collector set

In the left pane, right-click the name of the data collector set that you created and click **Start**. The Windows Performance Monitor tool starts monitoring your server and storing information in the location that you specified.

### Step 5: Analyze the data

Finally the moment that you've been waiting for! Open the log file for the data collector set in Tableau Desktop and start analyzing.

The following section provides some guidelines and recommendations for how to improve server performance based on the data that you collect.

## Tuning: Tweaking the server for better performance

Because no two server environments are identical, we can't provide hard and fast rules for tuning server performance.

Instead, we recommend that you look for patterns in the data that you collected from the administrative views and from Windows Performance Monitor.

For example, are there recurring spikes? Do any of the patterns that you notice in the administrative views correspond to similar patterns in Windows Performance Monitor?

Try to foster a practice of observing, testing, and incremental tuning.

In the end, most performance tuning for Tableau Server boils down to two general approaches:

- Optimizing for user traffic. This tunes the server to be responsive to users who are publishing and (especially) viewing workbooks.
- Optimizing for extract refreshes. This tunes the server to put its horsepower to work in updating data extracts from a database or other source.

Rendering views and refreshing extracts generate the most load on the server, so you should optimize for the task that your organization is most interested in.

## **Optimize for user traffic**

Here are some signs that you should optimize for user traffic:

- During peak traffic hours, overall resource utilization for the processor and memory are consistently high.
- The VizQL server process has a high percent processor time and large amount of private bytes dedicated.
- Spikes in user traffic noticeably affect view load times.

If you're seeing evidence of this type of activity, try making the following changes one at a time and observing how they affect performance.

## **Refresh the cache less often**

If your users do not always need the most up-to-date data, you can improve the performance of views by configuring Tableau Server to cache and reuse data as much as possible.

You can tune caching to increase the amount of time before data is cached. We covered cache configuration in the last chapter. See [Configure data connection caching](#).

## **Increase the number of VizQL server processes**

The VizQL server process is responsible for loading views and responding to user interaction, so adding more processes may help when dealing with many users. Because VizQL server processes can consume a lot CPU and memory, though, adding too many processes could end slowing down the server. Start by adding one server process at a time and measuring the effect with more performance monitoring.

1. Open TSM in a browser:

`https://<tsm-computer-name>:8850`. For more information, see [Sign in to Tableau Services Manager Web UI](#) [\(\(Link opens in a new window\)\)](#).

2. Click the [Configuration] tab.
3. Select the [VizQL] dropdown menu and increment the number of processes by at least one.
4. Click [Pending Changes] at the top right, and [Apply Changes and Restart] to commit the changes and restart Tableau Server.

## Optimize for extract refreshes

Here are some signs that you should optimize for extract refreshes:

- Extracts are failing or taking a long time to finish.
- The backgrounder process consistently has a high percentage of processor time.
- The VizQL server process has a low percentage of processor time and small amount of private bytes dedicated, even during peak traffic hours.

If you're seeing any of these things, try the following.

### Adjust the extract refresh schedule

Use the administrative view for extracts to identify optimal times for running extracts. In addition to running extracts in off-peak hours, you can distribute the running of extract refreshes to minimize concurrent server load. If extract refreshes continue to cause problems, reduce the frequency of extract refreshes as much as possible.

- Schedule extracts for times when the server isn't busy. (Use the administrative view to check traffic.)
- Reduce the frequency of refreshes.

### Configure extract refreshes to run in parallel

When you create an extract refresh schedule, ensure that the refresh runs in parallel execution mode.

### Increase backgrounder processes

1. Open TSM in a browser:

https://<tsm-computer-name>:8850. For more information, see [Sign in to Tableau Services Manager Web UI](#)[\[\(Link opens in a new window\)\]](#).

2. Click the [Configuration] tab.
3. Select the [Backgrounder] dropdown menu and increment the number of processes by at least one.
4. Click [Pending Changes] at the top right, and [Apply Changes and Restart] to commit the changes and restart Tableau Server.

Continue to [Open for Business!](#)

## Additional resources

- [Scheduled Extract Refreshes](#)[\[\(Link opens in a new window\)\]](#). A section of the Tableau Server Help that covers how to schedule refreshes for extracts.
- [Subscribe to Views](#). A topic in the Tableau User Help that explains how users subscribe to a view.
- [Windows Performance Monitoring](#). Documentation on the Microsoft TechNet site for the Windows Performance Monitor.
- [Tableau Server Processes](#). A list in the Help of all the Tableau Server processes.
- [Troubleshoot Disk Usage on Tableau Server Nodes](#). A topic in the Tableau Server Help that provides suggestions for viewing disk usage and freeing up disk space.

- [Designing Efficient Workbooks](#). A whitepaper on the Tableau.com site that describes best practices for users in order for them to produce effective, well-performing workbooks.