Securing Traffic Between Clients and Your Server

This chapter describes how Tableau Server communicates with other computers, and what you can do to make that traffic more secure.

A few curves ahead

Whereas previous chapters of *[Tableau Server: Everybody's Install Guide]* might have felt like cruising an empty highway on a clear day, this one might be more like heading up a mountain pass. Not a one-lane service road exactly, but one that requires a little more focus nonetheless.

It might help to know that some of this stuff can be tricky even for IT pros. But when we're talking about security of your sensitive data, would you trust an approach that was *too* easy?

If you've been going at it alone so far with this guide, now's the time to bring in your local IT professional. If you don't have an IT pro in-house, consider enlisting the help of Tableau Professional Services.

Even with IT help, we think it's important that anyone administering Tableau Server should understand the principles and procedures behind securing the environment. Plus, we don't want to decide for you what you'll enjoy learning about, or maybe even want to become pro at yourself. So we'll do our best here to convey what you need to get set up. Beyond that, you can find loads of info online---including in Tableau's own Help and KnowledgeBase articles.

An overview of HTTP and client-server communication

By default, Tableau Server, like many server applications, communicates with clients using the standard web protocol, namely HTTP. In HTTP, when a browser sends a request to the server, and when the server responds, the information is sent back and forth in clear text. That means anyone who can snoop on that communication can read its content.

Some of the information that your users and the server send back and forth might be sensitive. For example, a user might access Tableau Server through a web browser and send a user name and password to sign in to the server. Or a user might request a Tableau view created with sensitive data. If someone can see this traffic (and snooping on HTTP isn't hard for an experienced IT person), they might see information that they shouldn't.

Your security goals: privacy and trust

When it comes to securing communication between Tableau Server and its clients, you're after privacy and trust. To achieve privacy, you make HTTP content unreadable to anyone who might snoop. You do this by *encrypting* the traffic.

But you also need a trust relationship between the server and client. This means that when the server sends information, the client can trust that the information is coming from the server that the client thinks it's communicating with. Trust is established through *authentication*, similar to the way you as a user are authenticated when you provide a user name and password to sign in to your computer. Authentication helps to prevent a client from being fooled into communicating with a malicious site.

Using SSL to encrypt Tableau Server communication

SSL (secure sockets layer) is a protocol similar to HTTP, except that it that lets computers send encrypted information across a network such as the web. (We're using the term *SSL* as the generic name for this protocol; you might also see it referred to as *TLS*.) SSL accomplishes the two goals mentioned earlier---privacy and trust---through the encryption and authentication that we just mentioned. When SSL is enabled for Tableau Server, users can use `https://` instead of just `http://` to request content from the server.

Enabling SSL significantly improves the security of client-server traffic. If your instance of Tableau Server is accessible from the internet (not just on your internal network), configuring SSL for the server is *essential*. Making a server available on a public network without SSL is a serious security concern. Even if your server is not publicly accessible, a good practice is to enable SSL for client-server communication on your local network.

The following sections provide some background about how SSL works. We also describe requirements for using SSL with Tableau Server, whether you want to help secure traffic over the internet or on your local network. It describes how to enable SSL and points you to external resources for additional information. How you enable SSL on your local network depends on many factors in your environment. Your friend in IT will know how best to handle it for your particular server installation.

SSL and VPN

Some of your Tableau Server users might access your server from offsite using a VPN (virtual private network) connection to your network. In that case, although the users are offsite, the VPN connection itself provides both privacy and trust. It's still a good practice to enable SSL, but it's not essential if access to Tableau Server for your users is across a VPN.

SSL certificates

To support SSL, the server requires a *digital certificate**. *You can obtain a digital certificate from a publicly trusted, third-party entity known as a *certificate authority*, or CA. A trusted CA verifies your organization's identity and then issues a signed certificate that is unique to your organization. Examples of trusted CAs include Symantec (VeriSign), thawte, and GlobalSign. There are many others.

"Publicly trusted" means that all operating systems, Tableau-supported browsers, and other clients inherently trust the root certificates from these CAs. They meet web-industry standards for recommended encryption, and they require less of work from you to configure the client-server trust relationship.

After you've gone through the steps to get a certificate, the CA sends you your certificate as a set of files. When you receive the certificate files, you install them on your server. Then when a client tries to access the server, the information the client gets from the server's certificate allows the client to authenticate the server. This covers your goal of trust. The certificate also includes a public key, which enables the client to establish encrypted communications with the server. This covers the goal of privacy.

To describe this vetting process at a high level, when a client wants to start an encrypted session with the server, the client requests the server's certificate. (By the way, this all happens automatically when a user enters `https://` at the beginning of a URL.) The server replies with its certificate. The server's certificate usually points to the certificate of the issuer, which might in turn point to a certificate by a different issuer, all the way up to the CA---in practice, there's usually a whole chain of certificates. The client examines the certificate, or all the certificates in the chain, and compares the CA information in the certificate against CA information that the client already has. (Browsers and other clients maintain a store of known CAs.) If the client determines that the certificates are valid and trusted, the client and server can begin an encrypted session and exchange information.

Mutual (two-way) SSL

We'll just mention here that it's possible to configure *mutual SSL*, sometimes called *two-way SSL*, where both the server and the client have certificates. Mutual SSL is particularly useful if your users will be accessing the server from public locations, especially over public wifi, because it helps make sure that only preconfigured clients are allowed access to the server.

The client certificate for mutual SSL is typically generated by IT people inside your organization. The client certificate contains a user name and information to make sure the certificate can't be forged. With mutual SSL, when the client starts a session with the server, the client requests and examines the server's certificate, as usual. Then the server requests and examines the client's certificate to determine its validity.

We won't say more about mutual SSL in this guide, but later in this chapter we'll have links to more information in case this seems like a feature you want to enable for your Tableau Server installation.

Self-signed certificates

Your organization can generate its own certificate without going through the vetting process that a CA offers. This creates a *self-signed certificate*. A self-signed certificate allows the client and server to establish encrypted sessions. However, it doesn't let the client verify the server's identity (authenticate the server). When users connect to the server, they see a message that says something like "This certificate is not trusted." The exact text depends on the browser or other client.

By default, many Tableau clients, including Tableau Mobile, will not work with a self-signed certificate on Tableau Server. For some clients (like iOS devices), you can configure the device to trust a self-signed certificate. If you're curious about this, take a look at the KnowledgeBase article about using Tableau Mobile with an SSL server, listed in the additional resources section at the end of this chapter.

We recommend that instead of trying to work with the "certificate not trusted" browser warning, or configuring devices to work with self-signed certificates (with potential for unreliable results), you get a publicly trusted certificate from a known CA.

SSL for client-server traffic inside your organization

The certificate that you obtain from the trusted CA helps secure traffic between your server and users working on computers outside your organization---that is for traffic from the internet. For this scenario, clients use your server's *fully qualified* (public) *domain name*, such as `https://www.example.com/`. (Notice the `s` at the end of `https://`)

You can also enable SSL encryption on traffic *inside* your local network. This protects traffic when your colleagues are accessing the server using an internal host name, such as `https://tableauserver`.

The following sections describe some options for enabling SSL for internal traffic. Our recommendations follow these descriptions. Get together with your IT partner to determine which one suits your environment best and then help you configure it.

Use your organization's existing internal CA and self-signed root certificate

If your organization has an IT team, ask them if they have their own internal certificate authority. If they do, ask them to create a certificate for you. Often, these certificates will be automatically trusted by your Tableau users' computers, so you don't have to go through the process of configuring each client to trust the certificate.

If you don't have an internal CA, an alternative is to use OpenSSL, an open-source tool that comes with Tableau Server, to create an internal CA. Then you set each client to trust the internal CA. When you need to update the certificate, you can push it out to clients through the system management tool you use, such as Group Policy.

Although steps to do this are documented in the Tableau Server Help and out on the web, they require coordinating many moving parts at the system level of your computer. We do not encourage doing this without an experienced IT partner.

Create a self-signed certificate for your server, and configure clients to support it

Yes, we really are saying the exact opposite of what we just said in the section about using self-signed certificates for public traffic. But here's why it's okay: for client-server traffic that's isolated inside your organization's private network, you don't need public-level trust that you get with a CA-issued certificate.

Even for your internal traffic, you'll have to configure browsers on each user's computer, iOS devices, and other clients to support the self-signed certificate. Otherwise you'll have to tell your users how to deal with the "untrusted site" warning that appears in the browser when they try to connect. Another caveat is that even if you configure clients, you'll need to do it again when the certificate expires and you need to reissue it.

How to decide which option to use

When it comes to enabling SSL for internal traffic to Tableau Server, here's our order of preference. If the preferred option is impractical for your organization (for example, you have no internal CA), try the next option.

1. If your organization has an internal CA, use it. This enables you to enable SSL internally, while sparing your users the pesky "untrusted certificate" browser messages.
2. Use a self-signed certificate, and configure clients to trust it, or explain to users that it's okay to make an exception for Tableau Server and ignore the "untrusted site" browser message.
3. Obtain a certificate from a publicly trusted CA.
4. If none of the first three options is available, enlist your IT department to help you with the process described for creating an internal CA.

Get and install a public certificate for Tableau Server

The process for obtaining a certificate is different for each CA, and cost varies by CA and level of certificate you get. If your organization doesn't have an IT department, the best way to start is by searching the web using a phrase like "get ssl certificate" and reading through the offerings from different CAs.

If your organization *does* have an IT department, ask them if they have a relationship with public certificate authorities and can streamline the acquisition process.

Your IT pro will need to know the following requirements for certificates you install on Tableau Server. (The acronyms represent different encryption algorithms. For the purposes at hand, you don't need to learn more about them other than to satisfy any curiosity you might have.)

- The server certificate must be a PEM-encoded x509 certificate.

  Other formats are possible, so make sure that you get a PEM-encoded certificate, or use a tool such as OpenSSL to save the certificate in PEM format.

- The certificate `.key` file contains the key in RSA or DSA format and an embedded passphrase, and the file itself is not password protected.

- If the server certificate is not signed by a root CA directly, the issuer should provide a chain file.

  The chain file must likewise be in PEM format and must contain all of the intermediate certificates between the server certificate and the root certificate. Including the root certificate (or "trust anchor") is optional. The chain file is required if you want users of Tableau Mobile or Tableau Desktop on the Mac to connect to the server.

Enable SSL

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. On the [Configuration] tab, select [Security] > [External SSL].

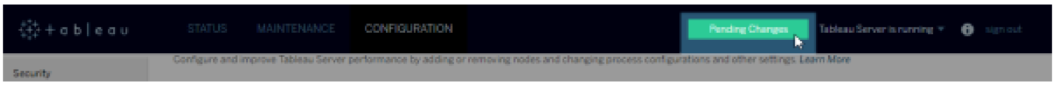
3. Under [External web server SSL], select [Enable SSL for server communication].

4. Upload the certificate and key files, and if required for your environment, upload the chain file and enter the passphrase key:

   Configure SSL screenshot

5. Click [Save Pending Changes].

6. Click [Pending Changes] at the top of the page:

   Configure and improve Tableau Server performance by adding or removing nodes and changing process configurations and other settings. Learn More

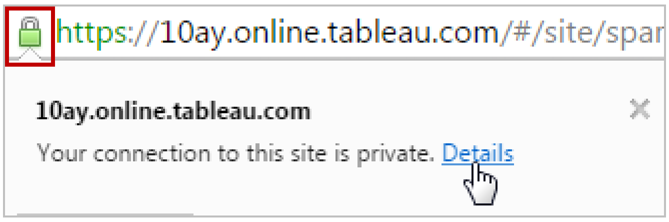
7. Click [Apply Changes and Restart].

View the certificate

After you install the files, you can navigate to your site in a browser and view the certificate. We'll use Tableau Online on Google Chrome to show you how this works.

1. Open your browser and go to `online.tableau.com`.

2. Click the green padlock that appears in the address bar.

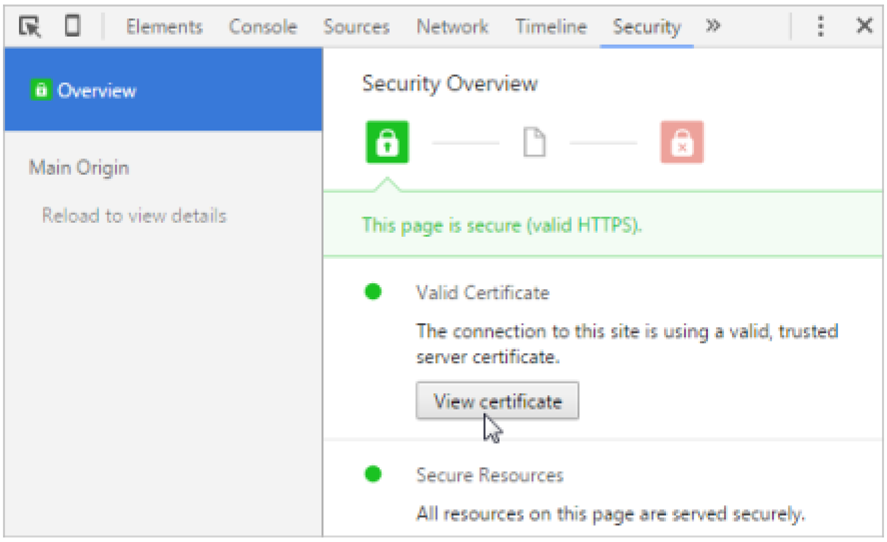
   

   https://10ay.online.tableau.com/#/site/spar

   10ay.online.tableau.com

   Your connection to this site is private. Details

3. Click the [Details] link. The site's security overview appears.



Security Overview

This page is secure (valid HTTPS).

Valid Certificate

The connection to this site is using a valid, trusted server certificate.

Secure Resources

All resources on this page are served securely.

The display shows that Chrome has determined that the site uses a valid, trusted certificate. As you click around in the security overview, you can also see the CA that issued the certificate and the chain of trust. Click [View certificate] here to see more specific information (although don't worry that it doesn't mean much here).

You can try this in different browsers to see how each displays the certificate information, or different sites that you sign in to, such as an online banking account.

Be nice to your future self

When you get the certificate files, make a note of their expiration date, and set up a plan now to update the certificate before it expires. Set a reminder on your calendar three months before the expiration date. Take notes on who you contacted to get the certificate, include purchase orders, receipts, and ticket numbers.

Also be nice to someone else who might be doing this work next time, and include this information in your system documentation.

Continue to Configuring Communication with the Internet.

Additional resources

- Creating your own CA[(Link opens in a new window)]. A third-party article that describes how to set up a self-signed certificate for SSL traffic on your local network.
- Obtaining an SSL Certificate for Tableau Server[(Link opens in a new window)]. A topic in the Tableau Server Help that walks through the process of how to get a certificate from a CA.
- Using Tableau Mobile with a Server Configured for SSL[(Link opens in a new window)]. An article in the Tableau Knowledge Base that discusses how to use mobile devices to connect to Tableau Server.
- Configure External SSL[(Link opens in a new window)]. A topic in the Tableau Server Help that discusses how to configure the server to use a certificate.
- Quick Start on Mutual SSL[(Link opens in a new window)]. A short article in the Tableau Server Help that discusses how to set up mutual (two-way) SSL.