Anyware Trust Center Administrators' Guide

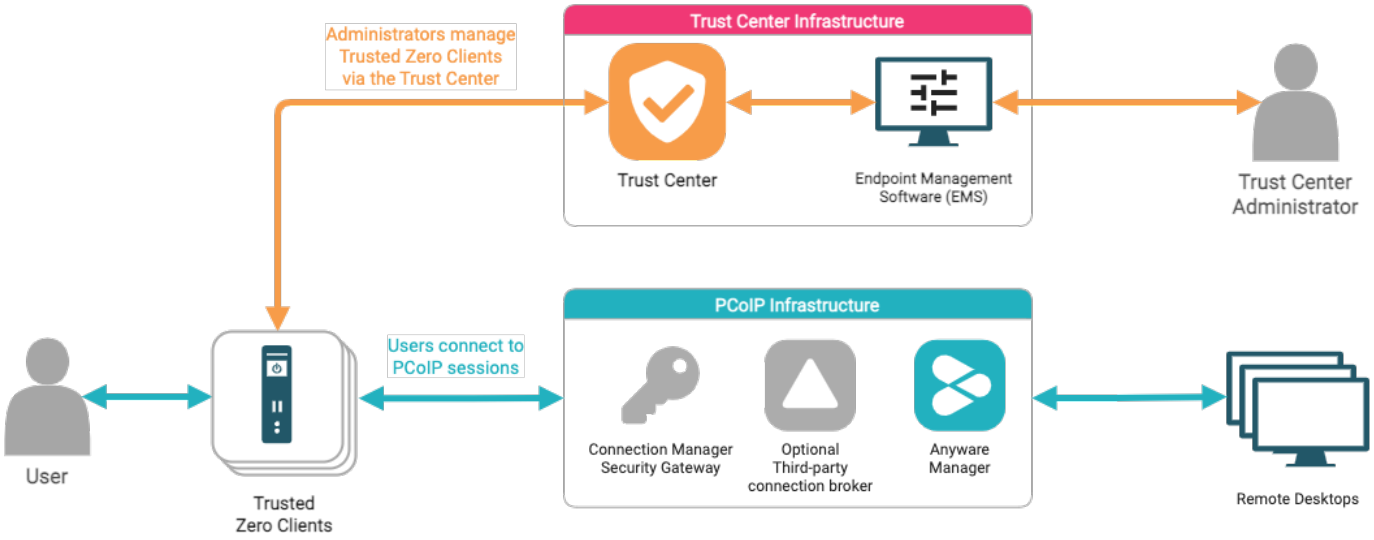
23.12

Table of Contents

Anyware Trust Center Administrators' Guide

Anyware Trust Center Administrators' Guide

The Anyware Trust Center provides a management and security plane for a Trusted Zero Client deployment. Using the Anyware Trust Center, administrators can register Trusted Zero Clients, manage their capabilities and features, enable and disable connections, and monitor access behavior.



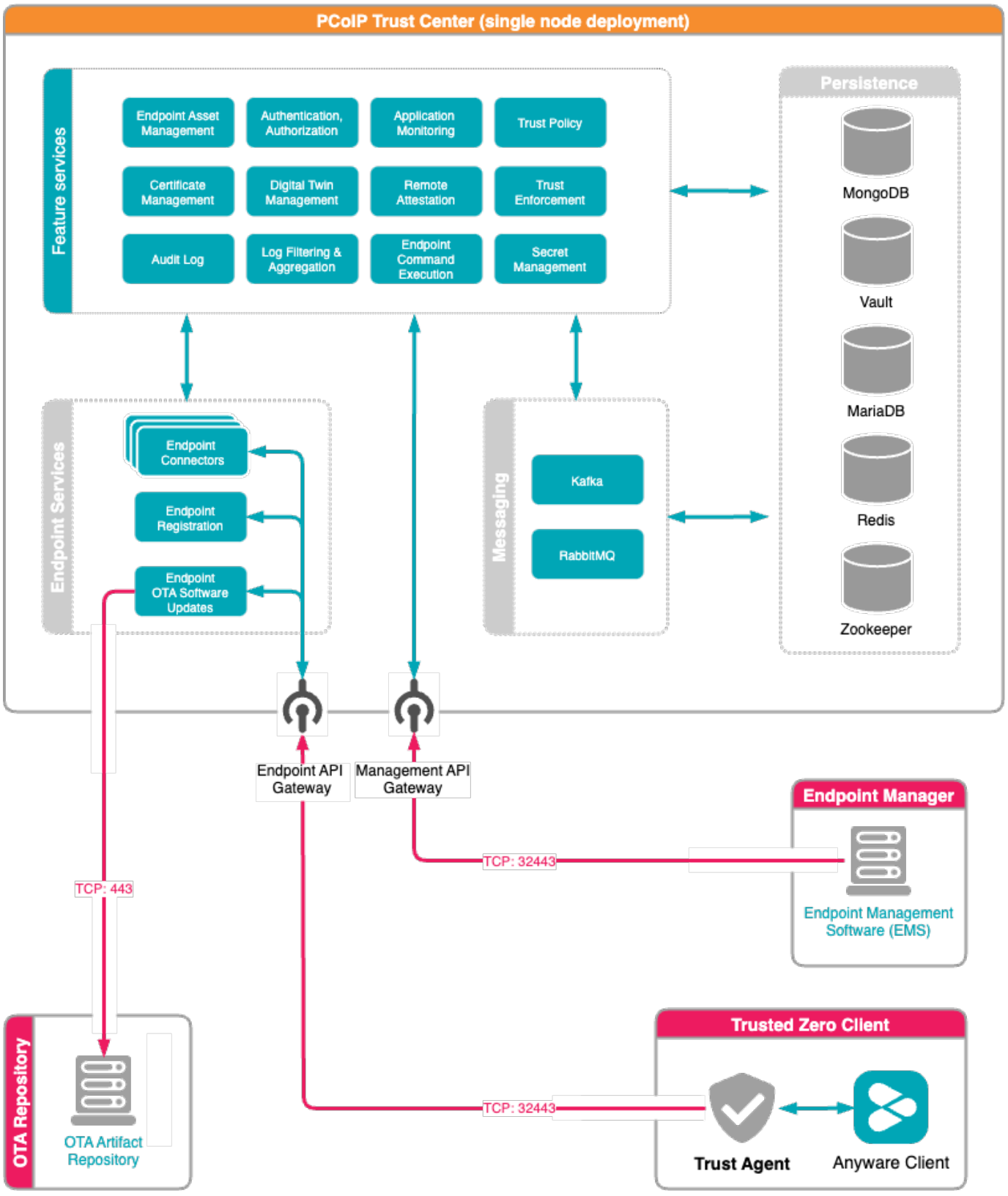
The Anyware Trust Center is an application composed of multiple services on a single VM. It connects to Trusted Zero Client endpoints and your Endpoint Manager.

Important: About Endpoint Managers

The Anyware Trust Center is an API service, and has no user interface. All user interaction and interfaces are provided by an *Endpoint Manager*, also called *Endpoint Management Software (EMS)*. HP does not provide Endpoint Management Software; it is available from your endpoint manufacturer.

Anyware Trust Center Architecture

The Anyware Trust Center is composed of multiple feature services which communicate internally within the cluster, and also securely communicate with the distributed Trusted Zero Clients and the Endpoint Manager.



About Anyware Trust Center Persistence

The Anyware Trust Center uses multiple services for data persistence. The following table lists these services and briefly describes how each is used.

Service	Description
MongoDB	MongoDB maintains management data, including endpoint configuration, digital twins, and system configuration.
MariaDB	Provides OTA update data and metadata.
Vault	Holds auth secrets, Anyware Trust Center user credentials, and endpoint operational PKI.
Redis	Audit logging and general system caching.

Note: About external services

The Anyware Trust Center does not currently support external instances of these services.

We recommend backing up the Anyware Trust Center and all persistent storage volumes.

About the Zero Trust Ecosystem

The PCoIP Zero Trust Ecosystem is a robust architecture for PCoIP deployments, founded on zero-trust principles and providing extremely secure PCoIP deployments. There are two primary components in the Zero Trust ecosystem: **Trusted Zero Clients**, which allow end users to connect to their remote desktops, and the **Anyware Trust Center**, which manages the Trusted Zero Clients and enforces policies and integrity.

Throughout this document, the Trusted Zero Clients may be referred to as *endpoints*. Currently, the Trusted Zero Client is the only endpoint managed by the Anyware Trust Center.

Security Provisions

The Anyware Trust Center establishes trust between a remote Trusted Client device in several key ways:

- **Birth Certificates**: Each factory-provisioned PCoIP Trusted Client provides a certificate, assigned when provisioned by the vendor, which is used to establish a trust relationship with your Anyware Trust Center. If a device has an unknown birth certificate, or if its certificate is not signed as expected, it cannot connect.
- **Digital Twins**: The Anyware Trust Center maintains a copy of the *expected* state and the *current* (actual) state of each Trusted Zero Client it manages.

  Each time a Trusted Zero Client connects, the Anyware Trust Center reads the endpoint's current state and compares it with the expected state. If the Trusted Zero Client has been tampered with, the two states will not match, and your Endpoint Management Software (EMS) can revoke its trusted status.

  When administrators modify a Trusted Zero Client's settings, the Anyware Trust Center updates its local copy (the *expected* state), and pushes the changes to the physical Trusted Zero Client the next time it connects.
- **Direct Secure Boot**: Users cannot access the firmware, BIOS, or operating system of the Trusted Zero Clients. Each device securely boots directly into the PCoIP client application.
- **OTA Updates**: Firmware updates for Trusted Zero Clients are delivered Over the Air (OTA), so bug fixes and security updates can be provided immediately when available. OTA updates are delivered

using TUF and Uptane frameworks, providing an update mechanism capable of resisting even nation-state level actors.

Important Terminology

- **Provisioning**: Provisioning is performed at the factory, when the Trusted Zero Client is prepared for delivery. This process includes creating the device's birth certificate and signing it with an HP certificate authority.
- **Registration**: The initial connection between a Trusted Zero Client and the Anyware Trust Center, when the Trusted Zero Client is added to the Anyware Trust Center's list of managed devices. After registration, the Trust Center can manage the Trusted Zero Client, and users can connect to their authorized desktops.
- **PKI**: PKI stands for *Public Key Infrastructure*, which is a method of distributing and managing security certificates. The Anyware Trust Center supports either an external PKI, which you provide, or an internal service for smaller or less-complex deployments. External PKIs must provide an externally-issued signing CA that the Anyware Trust Center uses to generate operational certificates.
- **Endpoint Management Software (EMS)**: Also called an *Endpoint Manager*, the Endpoint Management Software is a third-party application that provides a user interface for the Anyware Trust Center. The Endpoint Management Software is available from your Trusted Zero Client manufacturer.

What's New in This Release

Release 23.12 of the Anyware Trust Center includes the following:

Endpoint Maximum Increased

Performance improvements in 23.12 allow the Anyware Trust Center to support 5,000 endpoints (previously, the maximum was 1,000).

Minimum Requirements Lowered

Performance improvements also allow the Anyware Trust Center to use half the previous vCPU and RAM specification; the Anyware Trust Center now requires at least 4 vCPUs and 16GB of RAM (previously, the minimum was 8 vCPUs and 32GB of RAM). See System Requirements for more information.

New Device Timeout Policy

You can now set a policy for the length of time that a Trusted Zero Client can remain disconnected from a Anyware Trust Center before it becomes untrusted.

System Requirements

The Anyware Trust Center is installed on a machine that meets the following minimum requirements:

Requirement	
Operating System	• RHEL 8,9 • Rocky Linux 8, 9
CPUs	4 vCPUs
Memory	16GB RAM
Disk	120GB+, including 80GB+ disk space on `/var` for persistent volumes
Network	• IP network accessible by your endpoints, with configured DNS. The Anyware Trust Center does not support connections via raw IP addresses. • TCP 32443 (Communication with Trusted Zero Clients) • TCP 443 (Communication with OTA update CDN)
Python	The post-installation and initialization scripts require Python 3.8.2+.
Other software	The OS must have cURL available.

Note that the specifications listed here are minimums. Large or complex deployments should expect to use machines with higher specifications.

Important: A management tool is required

The Anyware Trust Center is an API service and has no user interface. The Anyware Trust Center must be able to connect to a compatible Endpoint Management Tool from a supported manufacturer.

Anyware Trust Center Features

The Anyware Trust Center supports a number of endpoint management settings and capabilities, some of which are constrained by your subscription level. The available features and support level are described next.

About Licensing and Subscription Tiers

Most Anyware Trust Center functionality requires a subscription. Basic functionality is available for free for users who have small deployments, or who are testing proof-of-concept scenarios.

New Trusted Zero Client devices ship with a 12-month free subscription.

Endpoint Management

Feature	Free tier	Subscriber
Endpoints under management	up to 50	up to 5,000[1]
Endpoint monitoring	Yes	Yes
Device Logging	Yes	Yes
Endpoint power management	Yes	Yes
Endpoint factory reset	Yes	Yes
Over-the-Air (OTA) updates	—	Yes
Set USB usage policies	—	Yes

Endpoint Under Management

The Anyware Trust Center can manage a large number of endpoint devices. The specific number of supported endpoints supported depends on your subscription tier, as noted above. The free tier, which does not require a subscription, is limited to 50 devices.

Endpoint Auto-Discovery and Configuration

When a new Trusted Zero Client connects to the Anyware Trust Center, it will automatically register and configure it according to policies established in your EMS software.

Endpoint Monitoring

The Anyware Trust Center supports status monitoring of all devices in your deployment, which can be used to display dashboards and other relevant management information in your Endpoint Manager.

Device Logging

The Anyware Trust Center can access logs for all of its managed Trusted Zero Clients, allowing administrators to troubleshoot deployment problems and monitor unusual activity.

Endpoint Power Management

The Anyware Trust Center can shut down or restart the endpoint devices it manages.

Endpoint Factory Reset

The Anyware Trust Center can reset any endpoint to factory defaults.

After a factory reset, the endpoint must re-register with the Trust Center. If it is on the same network as the Trust Center, and if the discovery DNS record is created, this will happen automatically when the device boots up. Otherwise, you will be prompted for the FQDN of the Trust Center.

Over-the-Air (OTA) Updates

The Anyware Trust Center can retrieve device software updates and deploy them to its endpoints automatically. Updates can be configured to install immediately, on a schedule, or by prompting the end user.

Set USB Usage Policies

USB policies can be set for each Trusted Zero Client that the Anyware Trust Center manages. Note that USB policies can also be set on remote PCoIP agents; USB devices must be allowed by *both* the Anyware Trust Center and the PCoIP agent. PCoIP agents, by default, permit all supported USB access.

Anyware Trust Center Management

Feature	Free tier	Subscriber
Concurrent Anyware Trust Center user access	—	Yes
PKI Support	—	Yes
Configure trusted connections	—	Yes

Concurrent User Access

Any number of users can access the Anyware Trust Center via your EMS software at once.

PKI Support

The primary PKI is an internal Hashicorp Vault instance in the Anyware Trust Center. You can provide an issuing CA cert and key to the internal Vault, which allows the root of Trust to come from your existing PKI.

Configure Trusted Connections

Trusted connections can be configured on the Anyware Trust Center. When configured this way, the Trusted Zero Client devices registered with the Anyware Trust Center will not be able to set their own connections, and must use the connections configured.

---

1. The initial release of Anyware Trust Center supports up to 500 devices connected with a paid subscription. This limit will be increased to 10,000 in a future release. ↩

Installing

Trust Center Installation Overview

Deployment Modes

The current release of the Anyware Trust Center uses a **single-node** installation into a K3S cluster using a provided script. The installation script creates and configures the node for you, and does not require manual setup.

Future releases of the Anyware Trust Center will support multi-node environments, installed into a Kubernetes cluster which you create and manage yourself.

When to Use Single-Node Deployments

The single-node instance of the Anyware Trust Center is appropriate for the following use cases:

- You do not require high availability or redundancy; your security policies permit delayed policy enforcement in the event your Anyware Trust Center is down or unavailable for any reason.
- You are deploying a proof-of-concept system for testing purposes.
- You do not have in-house Kubernetes expertise, and are not retaining our Professional Services team.
- You do not expect to grow beyond the initial node.

> **Note: Migrating from single-node to multi-node deployments**
>
> When multi-node deployments are available, a migration procedure will be published to support moving from one model to the other.

FAILURE RAMIFICATIONS IN SINGLE-NODE DEPLOYMENTS

The single-node deployment of the Anyware Trust Center is not a high-availability configuration. If the Anyware Trust Center is unavailable for any reason, including network connectivity issues, the following will occur until service is restored:

- Endpoints cannot be managed and policies cannot be enforced.
- New endpoints cannot be added.
- Monitoring and logging of endpoints will be paused.
- **Users can still connect to PCoIP sessions while the Anyware Trust Center is down**.

Trusted Zero Clients continue to accumulate logging data even if the Anyware Trust Center is offline. When the Anyware Trust Center is reachable again, logging data will catch up automatically, without loss in continuity.

Planning for Future Multi-Node Deployments

> **Important: This method is not currently available**
>
> Multi-node deployments are not supported in this release of the Anyware Trust Center. This information is included here to help you plan for future deployments.

If any of the following describe your use case, you should plan to use the Multi-Node Installation method when it is available:

- You require high-availability SLAs and real-time monitoring of endpoints (in a single-node deployment, if the Anyware Trust Center is unreachable, monitoring is unavailable until the connection is restored).
- You have enterprise requirements such as multiple Trust Centers deployed in different regions, or a mix of cloud and on-premesis deployments.
- You will create or extend your own self-managed Kubernetes cluster, either by yourself or in consultation with our Professional Services team.

Single-Node Anyware Trust Center Installation

For small deployments, or as a proof-of-concept test, you can deploy the Anyware Trust Center using the included `trust-center-ctl` script. This script will create a single-node Kubernetes cluster and install the Anyware Trust Center and its dependencies.

Deploying the Anyware Trust Center involves the following steps:

1. Create a new VM to host the Anyware Trust Center.
2. Choose a domain name for connections to the Anyware Trust Center.
3. Configure DNS for the new machine.
4. Get the installation script from our website.
5. Run the installation script on the Anyware Trust Center machine.

1. Create a New VM

Deploy a dedicated server to host the Anyware Trust Center. The method used to do this will depend on your environment; if you are unsure how to proceed, ask your system administrators.

The Anyware Trust Center requires a dedicated server with the following specifications:

Requirement	
Operating System	• RHEL 8,9 • Rocky Linux 8, 9
CPUs	4 vCPUs
Memory	16GB RAM
Disk	120GB+, including 80GB+ disk space on `/var` for persistent volumes
Network	• IP network accessible by your endpoints, with configured DNS. The Anyware Trust Center does not support connections via raw IP addresses. • TCP 32443 (Communication with Trusted Zero Clients) • TCP 443 (Communication with OTA update CDN)
Python	The post-installation and initialization scripts require Python 3.8.2+.
Other software	The OS must have cURL available.

2. Choose a Domain Name

The Anyware Trust Center requires 5 domain names added to your DNS records. In this step, you're creating the *base* domain for the Anyware Trust Center, which will be used to construct the other 4 subdomains. You'll use this value in multiple locations during setup, so record the value and be ready to copy it.

In this procedure, we will use `trust-center.example.com` to demonstrate the domain name, and how it is leveraged to create the other required values.

3. Create DNS Records

Once your new dedicated server has been created, you must set up the following DNS A records that point to it. For each of the following items, replace `<domain-name>` with the domain name you recorded in the previous step.

- `<domain-name>`
- `api.<domain-name>`
- `endpoint-connector.<domain-name>`

- `ota.<domain-name>`
- `register.<domain-name>`

> **Important: Supporting automatic Anyware Trust Center discovery**
>
> If you plan to support automatic Anyware Trust Center discovery by endpoints, you must also create a CNAME record that redirects `anywaretrustcenter` to `register.<domain-name>`.

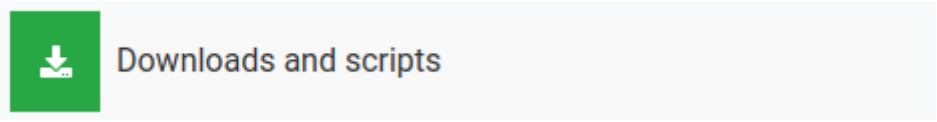
> **Example: using `trust-center.example.com`**
>
> Using `trust-center.example.com` as the base domain, you would create DNS records for the following:
>
> - `trust-center.example.com`
> - `api.trust-center.example.com`
> - `endpoint-connector.trust-center.example.com`
> - `ota.trust-center.example.com`
> - `register.trust-center.example.com`

4. Get the Installation Script

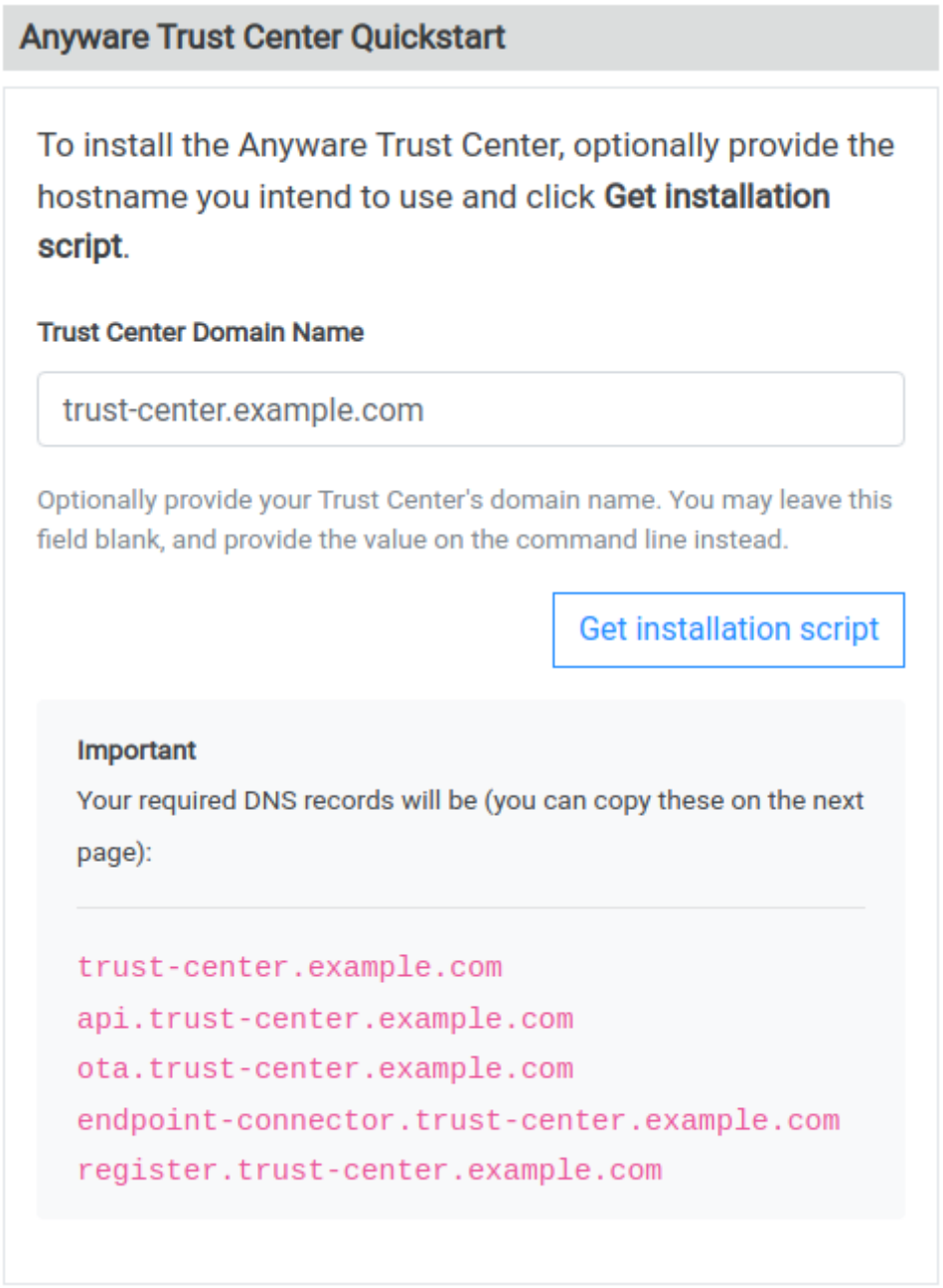
> **Note: Support account is required**
>
> To download the Anyware Trust Center installer, you must have an account on our support site (https://help.teradici.com). You can create one from the login screen if you don't already have one.

To download the installer:

1. Go to https://docs.teradici.com/find/product/anyware-trusted-endpoints/2023.12/anyware-trust-center.
2. If you are not already logged in, click **Log in to download** and authenticate your session.
3. Click **Downloads and scripts**:



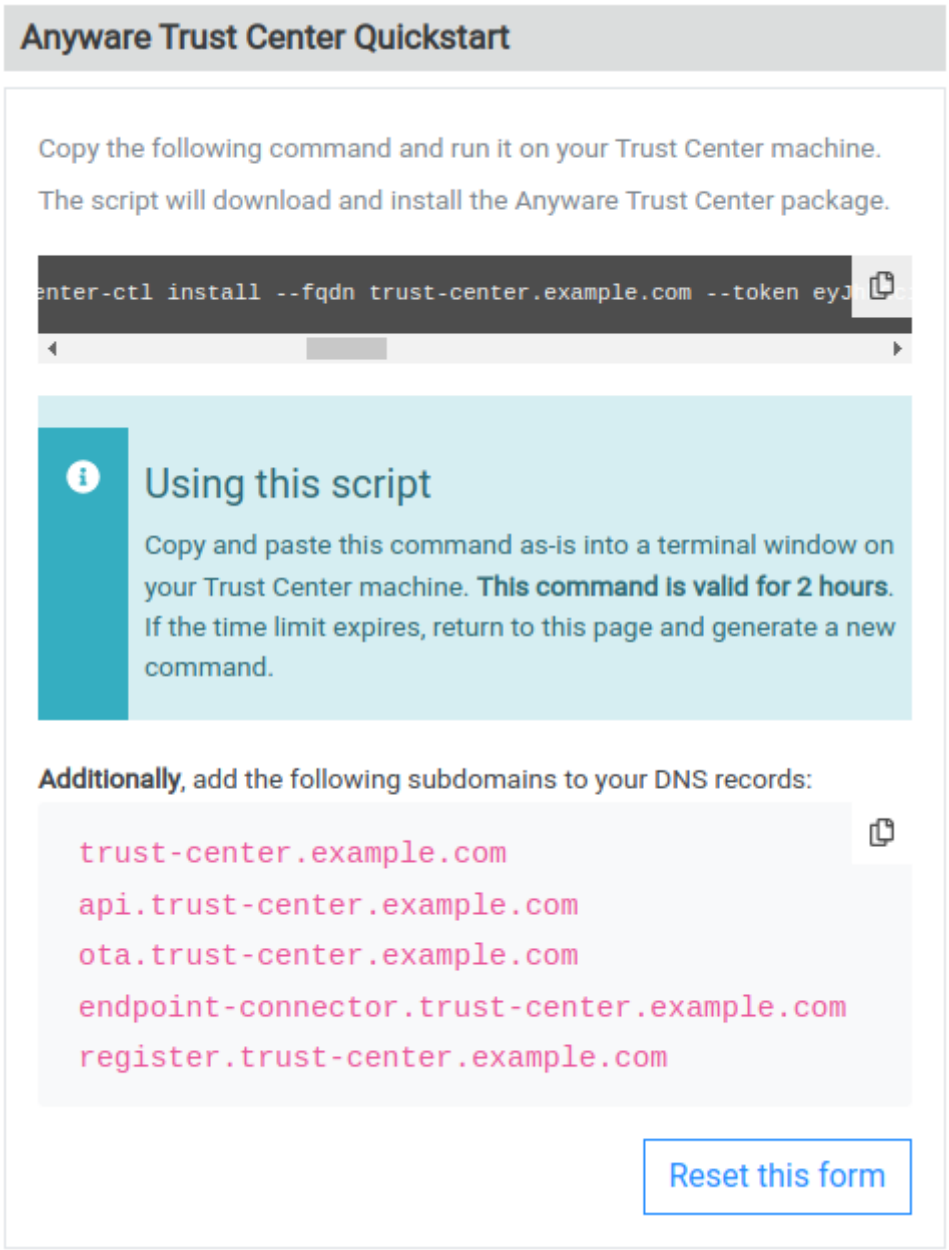
4. Read and accept the *End User License Agreement*. Once the agreement has been accepted, the download form is shown:



5. Provide your chosen FQDN—recorded earlier—in the **Trust Center Hostname (FQDN)** field, and click **Get installation script**.

> **Note: FQDN field is optional**
>
> The FQDN value is required to run the installer, but you do not have to supply it here. If you leave this field blank, you must manually add the actual FQDN to the script command before executing it.

6. The website will generate a download command and display it:



Copy the *entire* command displayed. There are two parts, and both are required: a curl command that downloads the installation script, and second command that executes the script.

The installation script command looks like this:

```
curl -sSL https://dl.anyware.hp.com/{token}/trust-center/raw/names/trust-center-tgz/versions/{version}/trust-center_{version}.tar.gz | tar -xz && sudo ./trust-center-ctl install --fqdn {trust-center-FQDN} --token {jwt token}
```

> **Important: This script is time-limited**
>
> The generated command is valid for 2 hours, after which installation will fail. If that occurs, return to the download page and generate a new command.

The rest of the steps below take place on the Anyware Trust Center VM. If you acquired the script command on a different machine, transfer it to the Anyware Trust Center VM using any acceptable method.

5. Run the Installation Script

1. Create or choose a directory on your newly-created VM, and enter it. The following example will create and enter a new `tc-installation` directory:

   ```
   mkdir tc-installation
   cd tc-installation
   ```

2. In a terminal window, paste the installation script command you copied earlier.

   The installation script will download all required packages and install them on the machine. **The installer takes approximately 15 minutes to complete**. There will be periods of time where the process stops printing messages to the terminal and may appear to hang; this is normal.

   > **Note: Troubleshooting problems**
   >
   > If you encounter breaking issues during installation, see troubleshooting for help.

   When executed, the installation command does the following:

   - Downloads the archive for the installer executable
   - Unzips the installer

- Run the installer as root, passing in two required flags:
- `fqdn`: The value must be a valid fully-qualified domain name *using only lowercase letters, numbers, and periods*, and should point to the location where the Anyware Trust Center is installed.
- `token`: the JWT token provided by the support site. This value should not be modified, and is valid for two hours after creation.

> **Note: Installation certification errors**
>
> You may see certification errors during installation, which are related to a plugin for Anyware Manager. These errors can be disregarded.

After installation completes, you will see a message similar to this:

3. To validate the installation, run the following command:

```
sudo ./trust-center-ctl diagnose
```

All services should report healthy.

After Installing

After installation completes, you can set up your management tool to interact and manage Trusted Zero Clients via the Anyware Trust Center.

Refer to the API documentation installed with the Anyware Trust Center for complete details.

Note: The administrator password is automatically generated

The administrator password is automatically generated by the Anyware Trust Center installer, and has the ability to create service account keys. The generated password is placed in the `config.yaml` file in your installation directory.

`<installation_folder>/config.yaml`:

```
global:
images:
    registry: "docker.cloudsmith.io/teradici/trust-center"
    username: "teradici/trust-center"
    password: <repository password>
tc:
    domain: <your domain>
    password: <this is the auto-generated password>
    endpointUpdate:
      accessKey: <repository password>
      repository: "teradici/trusted-zero-client"
```

Troubleshooting

Installation failures

Installation can fail on some distributions or environments unless additional configuration is done. Check the additional configuration requirements listed above. If any steps were missed:

1. Uninstall the Anyware Trust Center
2. Perform the relevant configuration steps
3. Install the Anyware Trust Center again. You will likely need to return to the download site and generate a new download command.

Creating a Support Bundle

Support bundles are archives that capture the current state of the Anyware Trust Center, and are used by our support team to diagnose and troubleshoot issues you may experience.

If you need to contact support, generate a support bundle using the procedure detailed in Creating a Support Bundle.

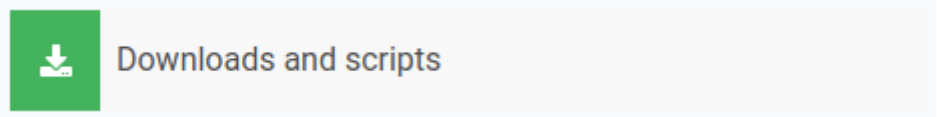
Upgrading the Anyware Trust Center

You can upgrade your Anyware Trust Center by running an upgrade script that we provide. The script will download the new package and automatically upgrade your installation.

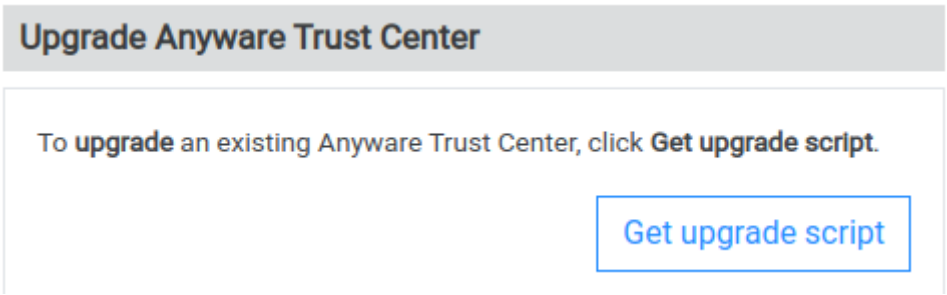
> **Note: Support account is required**
>
> To download the new Anyware Trust Center package, you must have an account on our support site (https://help.teradici.com). You can create one from the login screen if you don't already have one.

To upgrade your Anyware Trust Center:

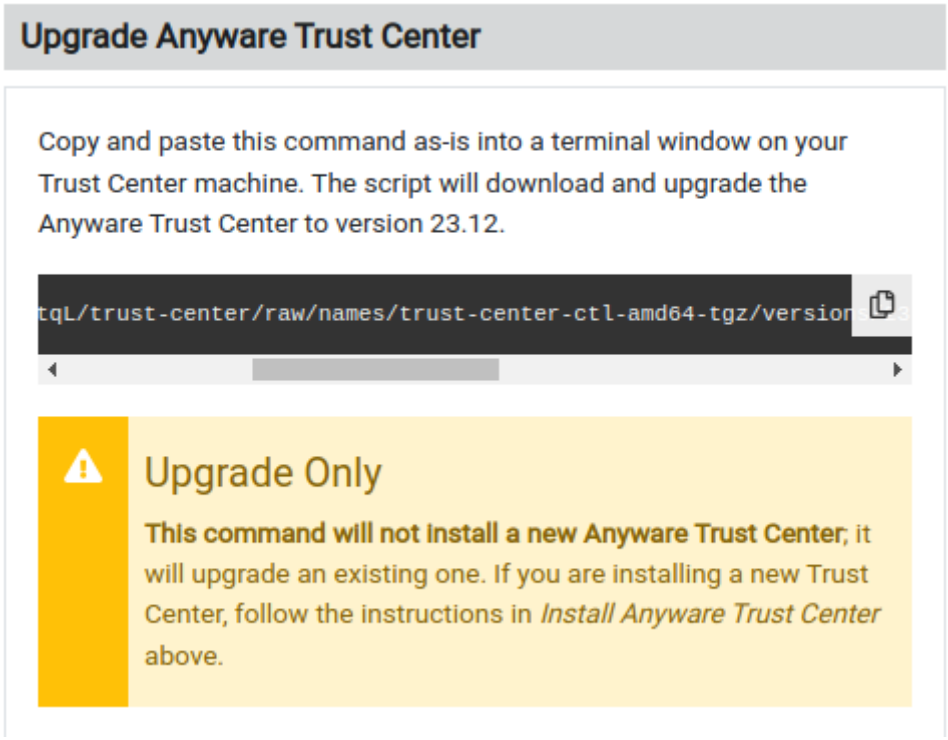
1. Go to https://docs.teradici.com/find/product/anyware-trusted-endpoints/2023.12/anyware-trust-center.
2. If you are not already logged in, click **Log in to download** and authenticate your session.
3. Click **Downloads and scripts**:



4. Read and accept the *End User License Agreement*. On the next screen, find the *Upgrade Anyware Trust Center* section, and click the **Get upgrade script** button.:



5. The website will generate an upgrade command and display it:



Copy the *entire* command displayed. There are two parts, and both are required: a curl command that downloads the new package, and second command that executes the script.

The upgrade script command looks like this:

```
curl -sSL https://dl.anyware.hp.com/{token}/trust-center/raw/names/trust-center-tgz/versions/{version}/trust-center_{version}.tar.gz | tar -xz && sudo ./trust-center-ctl upgrade
```

6. On the Anyware Trust Center VM, open a terminal window and navigate to the same directory used to install the original Anyware Trust Center.
7. Paste the command you copied in step 5 and press **Enter**.

> **Important: Upgrade must run in the Installation directory**
>
> The upgrade script must be run in the same directory used to install the Anyware Trust Center. If you run the script in a different location, the package will be downloaded but the upgrade script will fail.

The command will download the new package and execute an upgrade script.

Uninstall the Anyware Trust Center

You can uninstall the Anyware Trust Center completely from your system.

Danger: Data will be removed

Running this uninstall script will also remove all locally-stored data. Be sure to back up your system data if you are not using an external data store.

To uninstall the Anyware Trust Center and remove its data:

1. Open a console window and navigate to the installer directory.
2. In the console window, run the uninstall command:

```
sudo ./trust-center-ctl uninstall
```

Troubleshooting

Creating a Support Bundle

Support bundles are archives that capture the current state of the Anyware Trust Center, and are used by our support team to diagnose and troubleshoot issues you may experience.

> **Note: Support bundle includes a README file**
>
> The generated support bundle includes a README file at the root of the archive, containing information about viewing the files and folders in it.

To create a support bundle:

1. Open a console window and navigate to the working directory.
2. In the console window, run the following command:

```
sudo ./trust-center-ctl diagnose --support-bundle --cluster-type k3s
```

Support

If you encounter a problem setting up or using the Anyware Trust Center, there are a number of troubleshooting and support resources you can access.

- We maintain an extensive **knowledge base** which answers many questions and documents solutions to common problems. The knowledge base is part of the Knowledge Center; click on the *Articles* tab to access it, or enter a search query in the search field at the top of the page.
- We host a **community forum**, allowing you to ask questions and get answers from other IT professionals and our support team, which monitors this channel. The forum is part of the Knowledge Center; click on the *Discussions* tab to access it.
- If you need more help, open a support ticket and our support team will engage with you directly.