

Anyware Manager Installable Admin Guide

23.04

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Overview

HP Anyware Manager 23.04

Anyware Manager is a HP management plane enabling users to configure, manage and monitor brokering of remote workstations. Anyware Manager enables highly-scalable and cost-effective Anyware Software deployments by managing cloud compute costs by brokering PCoIP connections to remote workstations, see [Anyware Software](#) for supported hosts.

Anyware Manager is offered in 2 variants – as an HP managed Service, and as an installable instance deployed and managed by the users in their on-premises or cloud environments.

This document covers the installable instance variant of Anyware Manager.

For information on Anyware Manager as a Service, see [Anyware Manager as a Service](#).

Where Do I Begin?

Anyware Manager is a collection of microservices, and each microservice operates from its own docker container. These container images are deployed on a local lightweight Kubernetes (k3s) cluster, on a virtual machine. This cluster is set up on the virtual machine as part of the installation.

Before you begin installing Anyware Manager, it is important to understand what other components are required to enable end to end brokering:

HP Components:

- HP Anyware Connector
- HP PCoIP Registration Key
- [HP PCoIP Client](#)
- [HP PCoIP Agent](#)

Third-party Components:

- MongoDB
 - Internal: MongoDB
 - External: MongoDB compatible provider
- Vault
 - Internal: Hashicorp Vault
 - External: Azure Key Vault

MongoDB is the data store that hosts all Anyware Manager information, configurations and settings.

Hashicorp Vault is the secret storage where Anyware Manager can store and encrypt all the secrets and keys.

Azure Key Vault is the cloud service from Microsoft that enables the secure storage of, and access to, secrets.

Anyware Connector is an access hub that facilitates PCoIP connections to remote desktops and workstations by providing user authentication, entitlement and security gateway services. Later in this document it will be referred to as the "Connector". It is installed on a separate VM that resides in your environment. Based on your requirements, you may need more than a single Connector. Please ensure you have read all the installation guidelines and prerequisites in the [Connector](#) section.

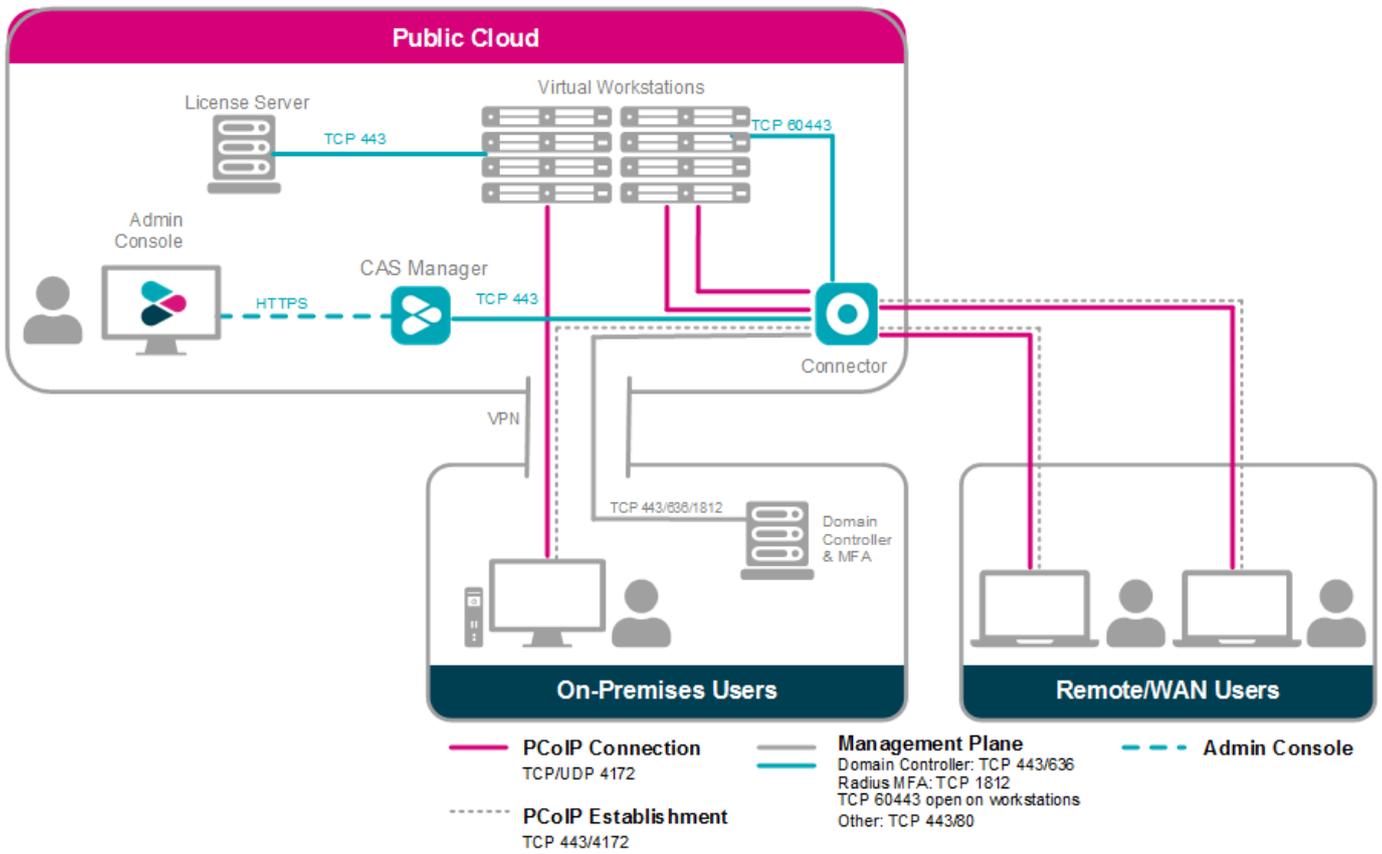
Where Do I Install Anyware Manager?

The following architectural diagrams depict where Anyware Manager can be installed in multiple infrastructures – be it the Public Cloud, On-Premises or a Hybrid deployment.

Please pay close attention to the number of Connectors required based on your setup, and the ports you may need to configure to allow PCoIP traffic (pre-session and in-session). These ports are outlined in the [Ports and Connections](#) table.

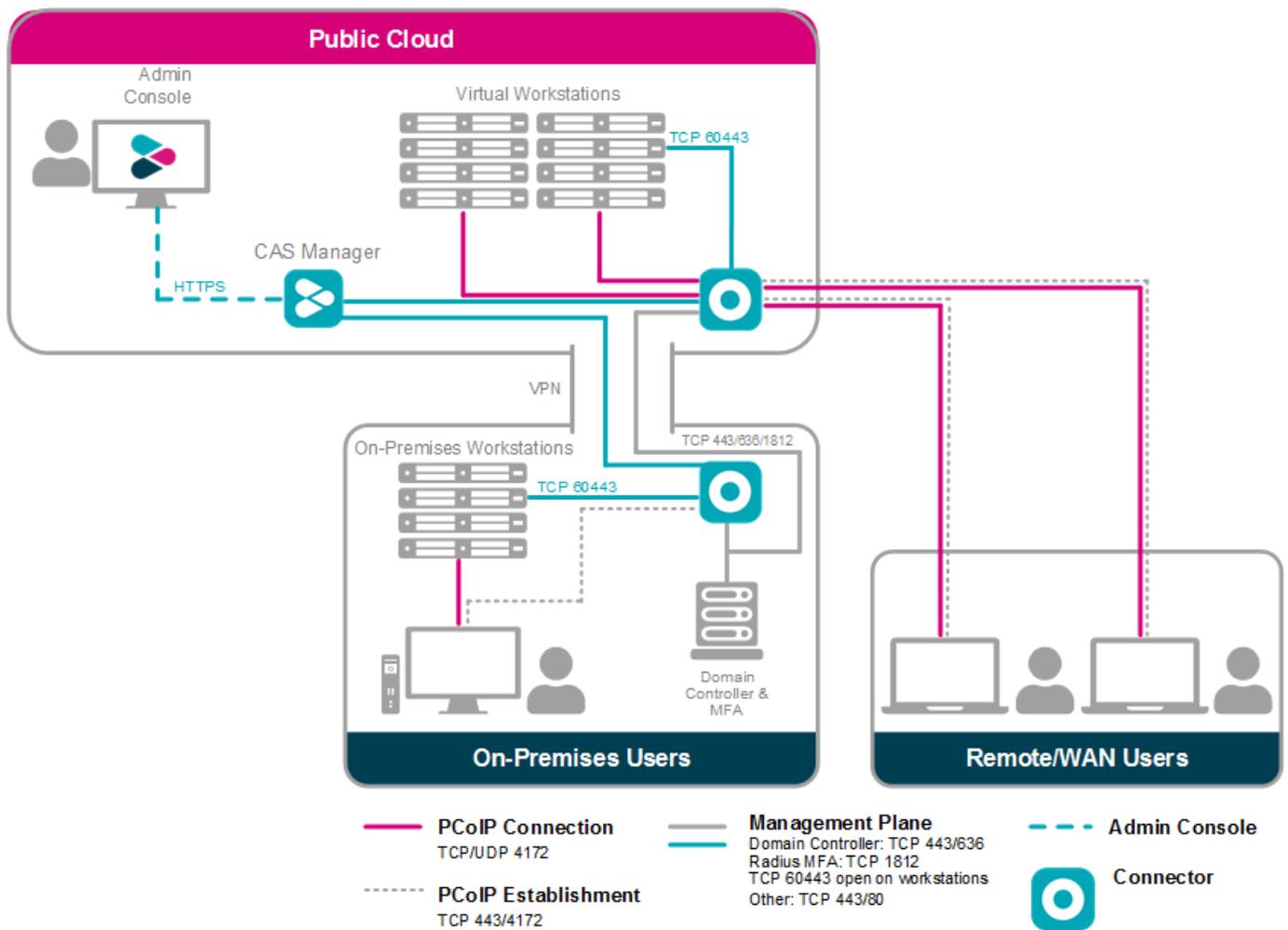
Public Cloud Deployment

The following diagram illustrates a public cloud deployment with Anyware Manager.



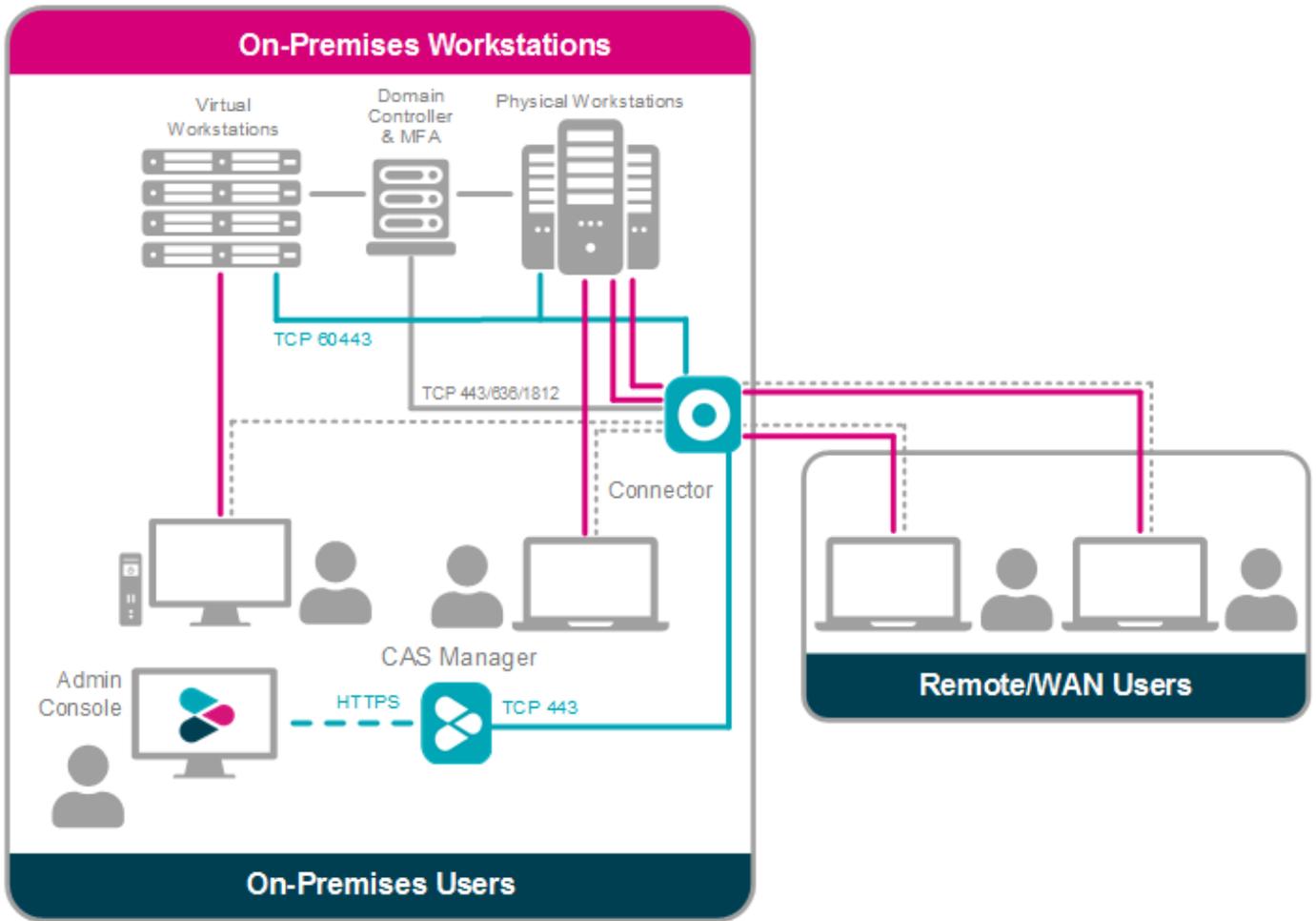
Hybrid Deployment

The following diagram illustrates a hybrid deployment where Anyware Manager is deployed in the Public Cloud.



On-Premises Deployment

The following diagram illustrates an on-premises deployment with Anyware Manager.



Ports and Connections

Anyware Manager requires certain ports to be open to enable connections between the other components such as Connector, MongoDB, Vault etc. For detailed breakdown of the ports and connection descriptions for Connector, see [Firewall and Load Balancing Considerations](#).

The following table outlines the required ports and connections for Anyware Manager:

Component	Allow	Port/Protocol	Source/Destination Component	Description
Anyware Manager	Inbound	443/TCP	From administrative web browsers, HTTP request clients and Connector.	To enable access to Anyware Manager.
Anyware Manager	Outbound	443/TCP	To the public license server.	Validates the CAS registration code.
Anyware Manager	Outbound	8200/TCP	To external Vault.	Stores Anyware Manager secrets.
Anyware Manager	Outbound	27017/TCP	To external MongoDB.	Stores Anyware Manager data.
Anyware Manager	Outbound	636/TCP	To Domain Controller.	Authenticates users to Anyware Manager.
Anyware Manager	Outbound	53/UDP	To DNS.	Domain name resolution.

What Deployment Topology Can I Use?

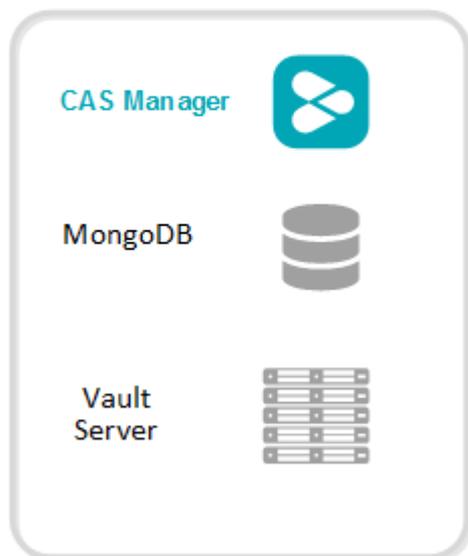
In terms of deployment topologies and scenarios, Anyware Manager is flexible and can be deployed in a single host, or with multiple hosts, depending on your organization's network environment and operational requirements. The possible deployment topologies are outlined below. Connector(s) are not included in these diagrams, they will be deployed on additional host(s) separately.

Single Host Deployment

This deployment configuration is when Anyware Manager and MongoDB and Vault server are running on a single host, it can be deployed on a virtual machine on any cloud or on-premise. It should be used for getting started with Anyware Manager for initial prototyping or smaller scale production deployments. If you use this configuration for production environment you must ensure there is a backup and restore process in place. This is necessary to minimize the loss of data and to minimize down time.

For information on installing Anyware Manager as part of a single host deployment, see [Installing Anyware Manager - Default Configuration](#).

SINGLE HOST DEPLOYMENT



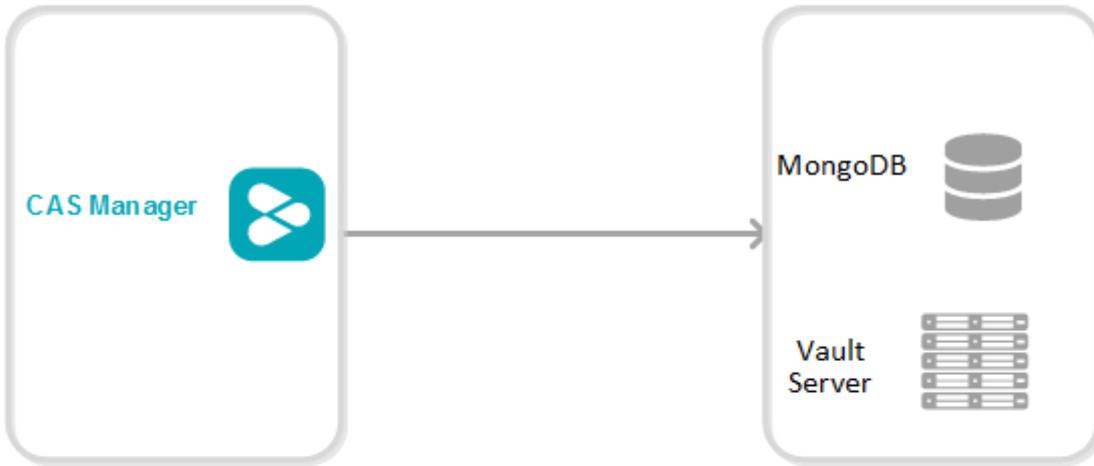
Two/Three Host Deployment

This deployment configuration is when Anyware Manager, MongoDB and Vault server are running on separate hosts. By hosting the database and secret storage on a separate machine, it reduces the risk of data loss in the case of Anyware Manager server failure. This configuration enables high-availability and scalability for Anyware Manager by deploying multiple instances of Anyware Manager. This configuration has the following limitations:

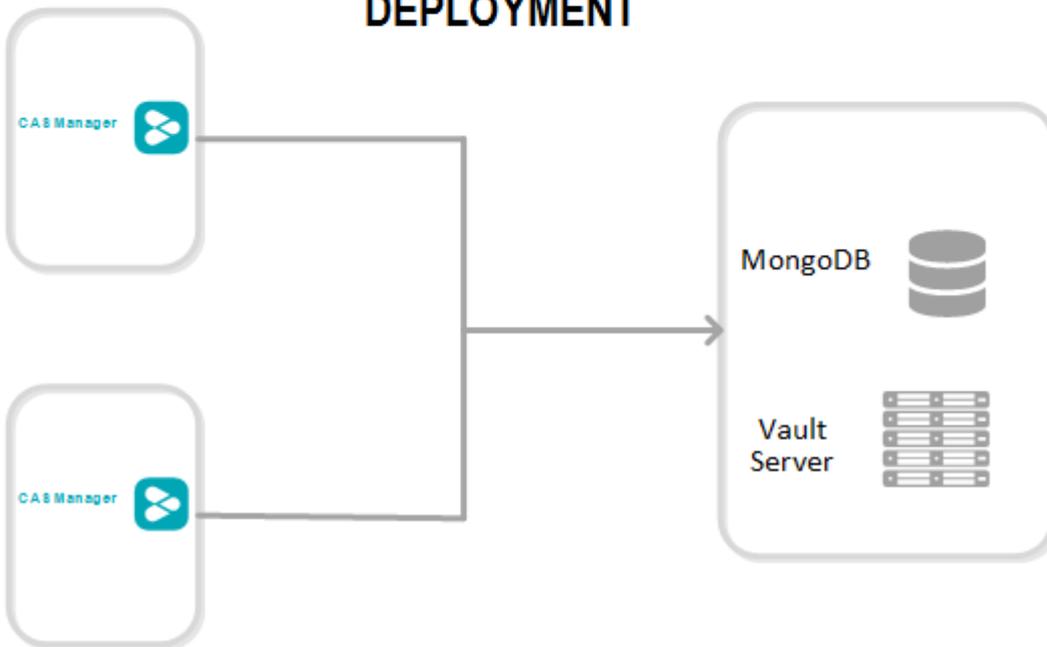
- With only one instance of MongoDB and Vault deployed, high-availability is not available to the data persistence layer, and a backup and restore process must be in place for the server hosting MongoDB and Vault to minimize data loss.
- You can configure this deployment on virtual machines hosted on-premises or on any cloud.
- This configuration requires a certain level of technical knowledge around MongoDB and Vault to properly deploy and operate these external components. For detailed deployment instructions on installing and configuring MongoDB and Vault in a single virtual machine to be used by Anyware Manager, see the following [KB article](#).

For information on installing Anyware Manager as part of a two/three host deployment, see [Installing Anyware Manager - External Configuration](#).

TWO HOST DEPLOYMENT



THREE HOST DEPLOYMENT



Five or more Hosts Deployment

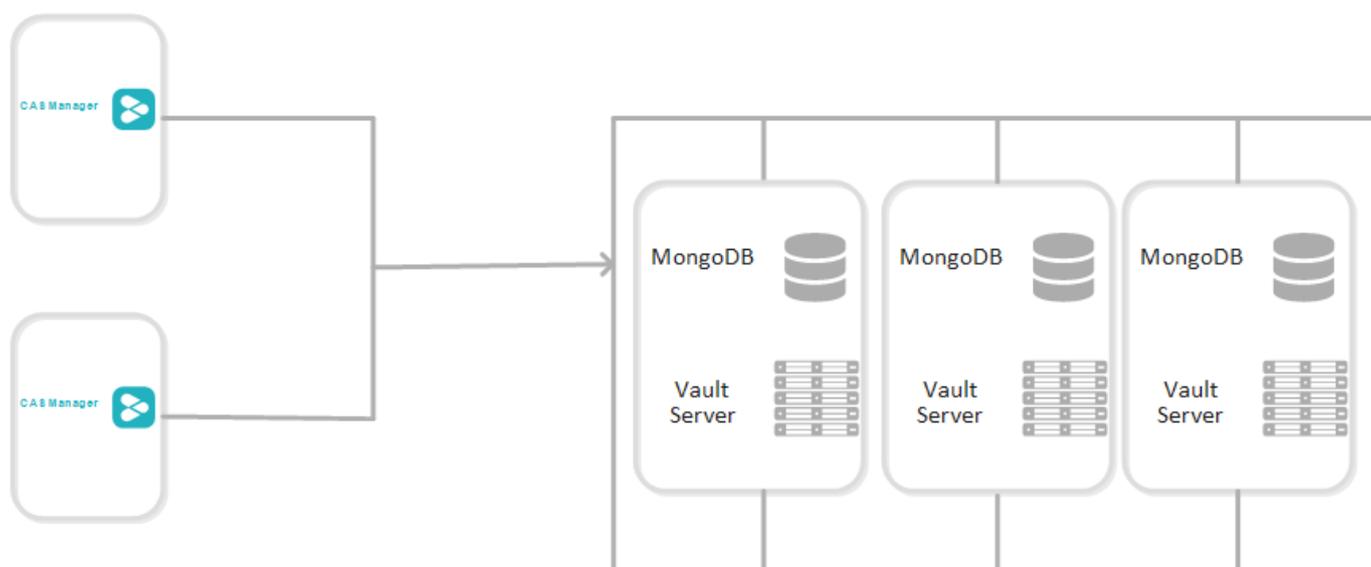
This deployment configuration provides high-availability for both Anyware Manager, and MongoDB and Vault server which are on separate hosts. In this configuration two or more Anyware Manager instances provides high-availability using a load balancer. The hosts that contain the MongoDB and

Vault server provide a basic high-availability for data persistence with a failure tolerant of 1. This configuration requires the following working knowledge:

- This is a complex environment and requires you to have working knowledge of installing, configuring and operating the MongoDB and Vault server services in a high-availability setup. Visit MongoDB and Hashicorp Vault official documentation sites for detailed instructions on how to carry out these steps.

For information on installing Anyware Manager as part of a five or more host deployment, see [Installing Anyware Manager - External Configuration](#).

FIVE + HOST DEPLOYMENT



How Do I Install Anyware Manager?

You need to setup and install a dedicated virtual machine which will host Anyware Manager. This virtual machine needs to meet certain system requirements which are outlined in the sections below. If you are using an external MongoDB and secret storage you need to prepare these components before installing Anyware Manager, and then configure them afterwards. The available configurations are outlined below.

Connector Installation

Once you have installed Anyware Manager using either of the configurations below, you need to install the Connector. This should take roughly **1 hour** to complete.

Using a Default Database and Secret Storage

This is the default installation of Anyware Manager where an instance of MongoDB and Vault is deployed as part of the installation. Installation of these components is seamlessly built into the Anyware Manager installer. This configuration does not scale beyond a single Anyware Manager instance and does not support high availability. For more information on this configuration, see [Installing Anyware Manager - Default Configuration](#).

Installation Time

Installing Anyware Manager with the default database and secret storage should take roughly **45 minutes** to complete. It should take a further **1 hour** to install the Connector.

Using an External Database and Secret Storage

With Anyware Manager you can prepare and install your own instances of MongoDB and Vault, or you can use an Azure Key Vault service, on a different virtual machine, by following the guidelines in the installation section. This enables you to upgrade or re-install Anyware Manager, and makes a high-availability service available. For more information on this configuration, see [Installing Anyware Manager - External Database and Secret Storage Configuration](#).

Production Environments

Installing Anyware Manager with an external database and secret storage should take roughly **2 hours** to complete. It should take a further **1 hour** to install the Connector.

Anyware Manager

Installing Anyware Manager - Default Configuration

The following section outlines how to install Anyware Manager with the default database and secret storage.

Installation Time

The default configuration of Anyware Manager uses an internal Vault and MongoDB. It will take roughly **45 minutes** to complete the installation.

Data Migration

Anyware Manager does not do any data migration when configuring your database and secret storage application. Any data stored when Anyware Manager is used with the default database and secret storage configuration, will not be transferred if the same Anyware Manager instance is re-configured to run with an external database and secret storage.

Firewall and Load Balancing Considerations

For information on firewall and load balancing ports connected to Anyware Manager and Connector, see [Firewall and Load Balancing Considerations](#)

Preparing the Anyware Manager Virtual Machine

The following section outlines how to prepare the system requirements, firewall configurations and proxy configurations on the Anyware Manager virtual machine:

System Requirements

You need to prepare a virtual machine that has the following requirements:

- Operating System: RHEL 8 and Rocky Linux 8.
- Minimum 8 GB RAM
- 4 CPU
- 60 GB Storage: If you are using LVM and `/var` is mounted on a separate volume, that volume must have 30GB or more in order for the installation to succeed and for Anyware Manager to function properly.
- Active Directory permissions set to **List contents** and **Read all properties**. If you do not set these permissions you will be unable to connect to specific remote workstations.
- The VM's hostname should be as per standards defined in **RFC1123** and it must:
 - Contain only 253 characters.
 - Contain only lowercase alphanumeric characters, '-' or '.'.
 - Start with an alphanumeric character.
 - End with an alphanumeric character.

Firewall Configuration

You must ensure your firewall is established and configured properly. Ensure port 443 is enabled in the firewall rules for the VM that Anyware Manager is running on.

Configure the firewall that the virtual network Anyware Manager is running by following the commands below:

1. Login to the Anyware Manager VM by ssh from a bash shell as *root*.
2. Check and confirm if `firewalld` is active by running the following command:

```
sudo systemctl status firewalld
```

3. If `firewalld` is active, follow the steps outlined below for firewall configuration. If `firewalld` is inactive, and your organization does not require firewall on the Anyware Manager VM, then skip the firewall configuration steps below and proceed to the remaining steps.

4. Run the following commands to configure the firewall:

```
sudo firewall-cmd --permanent --add-port=6443/tcp # virtual network flannel

sudo firewall-cmd --permanent --zone=trusted --add-source=10.42.0.0/16 # This
subnet is for the pods

sudo firewall-cmd --permanent --zone=trusted --add-source=10.43.0.0/16 # This
subnet is for the services

sudo firewall-cmd --reload
```

Proxy Configuration Variables

If HTTP/HTTPS proxy is used, then `HTTP_PROXY`, `HTTPS_PROXY` and `NO_PROXY` must be set. For `NO_PROXY`, specific IP addresses or domain names of service that are internal must be added. IP address ranges like "10.0.0.0/8" does not work; exact IP addresses or domain names must be used for `NO_PROXY` for the traffic to be routed through the proxy to work properly. The outlined variables need to be set in the `/etc/environment` file.

The following steps outline how to modify this file to add these variables:

1. Run the following command to edit the `/etc/environment/` file in vi. You could also use vim or nano:

```
sudo vi /etc/environment
```

2. Update the file to include the following environment variables.

```
HTTPS_PROXY="http://hostname_of_proxy:port"
HTTP_PROXY="http://hostname_of_proxy:port"
NO_PROXY=[list of all host names that should not go through the proxy, such
as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
ALL_PROXY="http://hostname_of_proxy:port"
https_proxy="http://hostname_of_proxy:port"
http_proxy="http://hostname_of_proxy:port"
no_proxy=""=[list of all host names that should not go through the proxy,
such as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
all_proxy="http://hostname_of_proxy:port"
```

3. Save the file. Once you install Anyware Manager you can configure it to use the proxy configuration. From this new terminal, proceed with the installation steps. The proxy configuration is implemented when Anyware Manager is installed.

Anyware Software Registration Code

Once you have a Anyware Software subscription HP will email a registration code to you. To contact sales and enquire about attaining a Anyware Software subscription, see [Contact Sales](#).

Installing Anyware Manager

The following section outlines how to install Anyware Manager with the default database and secret storage. These steps should be performed on the target machine by connecting via SSH or console.

System Requirements and Prerequisite Steps

Before installing Anyware Manager please ensure you have read through the system requirements, and configured the necessary prerequisites outlined above. Failure to do this will result in an unsuccessful installation of Anyware Manager.

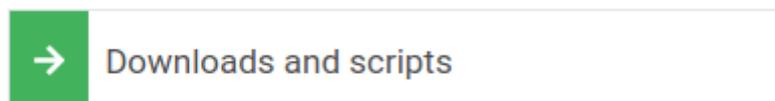
1. Add Anyware Manager Repository

The virtual machine you are adding the repo to must have access to the internet. If it doesn't, you will be unable to download and install the required files.

Anyware Manager Repositories

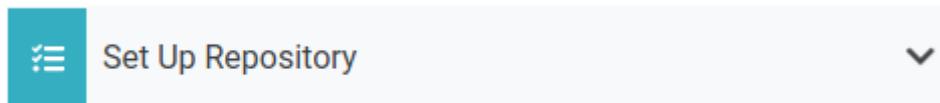
The new repository `teradici-anyware-manager` is introduced. If you currently have `teradici-cas-manager` repository, you must remove it. See [Repository Management](#) to remove them. Once the unwanted repos are removed, you can proceed with the installation process below.

1. To access the scripts and to configure and add the RHEL and Rocky Linux repository, select the **Downloads and scripts** option from the [Anyware Manager support site](#).



If you see a login button instead, click it to log into the site and then proceed.

2. Accept the End User License Agreement, then click **Set Up Repository**.



3. The window will expand and show the setup scripts for each supported operating system. Copy the command for your system to the clipboard.
4. Paste command on the target machine where you wish to install Anyware Manager and press `Enter`.

The command fetches a configuration script from our servers and runs it locally, setting up and configuring the repository on the local machine.

Run the following command to confirm `teradici-anyware-manager` repos were added into `dnf` repo.

```
dnf repolist --enabled teradici-anyware-manager*
```

The output from this command should list the repo id, names as outlined in the example below:

```
repo id                                repo name
teradici-anyware-manager-beta          teradici-anyware-
manager-beta
teradici-anyware-manager-beta-noarch   teradici-anyware-
manager-beta-noarch
teradici-anyware-manager-beta-source   teradici-anyware-
manager-beta-source
```

2. SELinux Configuration

SELinux policies are required for persistent storage and container logging on Anyware Manager. If SELinux policies are not found, data stored in Anyware Manager will be lost when the Anyware Manager Machine is shut down.

Once configured, and the installation has verified SELinux, all Anyware Manager related data will persist when the target machine hosting Anyware Manager is re-booted. To check if SELinux is already installed on your system, run the following command:

```
sudo dnf list installed | grep anyware-manager-selinux
```

The output from this command will notify if you if `selinux` is already running on your system. If it is not then you need to run the following commands to install the SELinux policies:

1. Run the following command to install the SELinux policies and set the basic framework for persistent database and Vault:

```
sudo dnf install -y selinux-policy-base container-selinux
```

2. Run the following command to install a specific version of SELinux that has been tested for K3s:

```
sudo dnf install -y https://github.com/k3s-io/k3s-selinux/releases/download/v1.1.stable.1/k3s-selinux-1.1-1.el8.noarch.rpm
```

3. Run the following command to install SELinux from the Anyware Manager repo:

```
sudo dnf install -y anyware-manager-selinux
```

Install Command Alias

The older command `sudo dnf install -y cas-manager` works as an alias for Anyware Manager installation.

3. Install Anyware Manager

Installation Commands Updated

Anyware Manager installation requires two commands comparing to previous version where only one command is required. If you have automated the installation in scripting, make sure the script is updated accordingly.

Run the following command to install Anyware Manager RPM:

```
sudo dnf install -y anyware-manager
```

The installer installs Anyware Manager, as well as all external components required.

These external components are:

- k3s
- MongoDB (data store)
- Vault (secret store from HashiCorp)
- A self-signed SSL certificate for HTTPS access

Run the following command to install Anyware Manager with the appropriate flags suits your needs, see "Installation Flags and Options" for all supported flags. The command example below will install Anyware Manager with self-signed certificate from teradici-anyware-manager* repo added in the pervious steps. Debug level log will be outputted to help troubleshooting.:

```
sudo /usr/local/bin/anyware-manager install --accept-policies --self-signed --debug
```

PASSWORD CONFIGURATION

You need to configure a password to install Anyware Manager instance on your system. The password adds a layer of protection to the system and is required when accessing the Web Admin Console. To meet the security standards, the password should be 8 characters in length with minimum 1 uppercase, 1 lowercase, 1 number and 1 special character.

Password Special Character

The % character and whitespaces are not supported.

Anyware manager installer requires Web Admin password and prompts for it, if this behavior is not preferred the password could be passed to the install command using:

```
--manager-admin-password
```

In case you forget the password, you can reset it using the following flag with the `configure` command:

```
--reset-admin-password
```

Password File

The `/opt/teradici/casm/temp-creds.txt` file that has the ability to store Anyware Manager password is not created any more by the installer. If you forget your password, you need to reset it using the `--reset-admin-password` flag.

INSTALLATION FLAGS AND OPTIONS

For detailed information on the installation flags and the configuration file parameters that you can pass during installation, see the table outlined below:

Flags	Example	Description
<code>--accept-policies</code>	<code>sudo /usr/local/bin/anyware-manager install --accept-policies</code>	If this flag is set, the installer does not prompt for accepting policies. This flag is optional
<code>--clear</code>	<code>sudo /usr/local/bin/anyware-manager install --clear</code>	This flag Removes data and files of an existing or previous Anyware Manager instance.
<code>--manifest</code>	<code>sudo /usr/local/bin/anyware-manager install --manifest</code>	This flag is set to provide a path for manifest files. This flag is optional.
<code>--self-signed</code>	<code>sudo /usr/local/bin/anyware-manager install --self-signed</code>	This flag is set to Automatically generate self-signed TLS cert and key. Setting this flag ignores <code>--tls-key</code> and <code>--tls-cert</code> flags.
<code>--tls-key</code>	<code>sudo /usr/local/bin/anyware-manager install --tls-key</code>	If this flag is set, it requires the full path and filename of the TLS key to use with the Anyware Manager.
<code>--tls-cert</code>	<code>sudo /usr/local/bin/anyware-manager install --tls-cert</code>	If this flag is set,it requires the full path and filename of the TLS certificate to use Anyware Manager.
<code>--registry</code>	<code>sudo /usr/local/bin/anyware-manager install --registry</code>	This flag is used to specify the container registry from which the Anyware Manager pulls container images.
<code>--registry-username</code>	<code>sudo /usr/local/bin/anyware-manager install --registry-username</code>	This flag is used to authenticate Anyware Manager username to the registry and to pull container images.
<code>--registry-password</code>	<code>sudo /usr/local/bin/anyware-manager install --registry-password</code>	This flag is used to authenticate Anyware Manager password to the registry to pull container images.
<code>--manager-admin-password</code>	<code>sudo /usr/local/bin/anyware-manager install --manager-admin-password</code>	This flag is used to create a new password for Anyware Manager during installation.
<code>--reset-admin-password</code>	<code>sudo /usr/local/bin/anyware-manager configure --reset-manager-password</code>	This flag is used to reset the password for Anyware Manager.

Vault Data Encryption

The Vault data that is installed as part of the Anyware Manager installation, is installed on the Anyware Manager virtual machine, and is encrypted at rest. It is recommended that you take appropriate measures to secure access to the filesystem. For information on this, see the [Filesystem Storage Backend](#) section of the HashiCorp Vault guide.

The installation process takes 5-10 minutes to complete, depending on your network connection speed and other environment variables. During this process, Anyware Manager is running a health check every 15 seconds to confirm that all required services are deployed and running successfully before reporting that the installation is complete.

Once the installation has been successful you should see a message stating **Anyware Manager installation complete**. The IP address of your Anyware Manager instance will also be displayed. The Anyware Manager version that has been installed will also be displayed.

If the installation appears unhealthy, you should generate a support bundle and send this to HP for investigation. For more information on generating a support bundle, see [Support Bundle](#). For more information on monitoring and assessing the health status of Anyware Manager, see [Health Status](#).

Generated Self-Signed Certificates

The installer will automatically generate several certificates to ensure that internal communication within the Anyware Manager and communication to the Anyware Manager itself are done over encrypted TLS connections. These certificates will be automatically generated as needed when Anyware Manager is initially installed or when upgrades are done. If for whatever reason you do not wish to upgrade, certificates will need to be periodically renewed, see [TLS Certificates](#) for steps on how to do this.

4. Configure Anyware Manager to use Proxy

The following section outlines the steps involved in enabling the proxy configuration with Anyware Manager:

1. If the proxy environment variables were not set before installing Anyware Manager, please see the [Proxy Configuration Variables](#) section above for the steps involved in setting these variables. If you already have these variables set, continue to step 2.
2. Establish a new ssh/shell session.

3. Configure Anyware Manager to use the proxy configuration by running the following command:

```
sudo /usr/local/bin/anyware-manager configure --enable-proxy
```

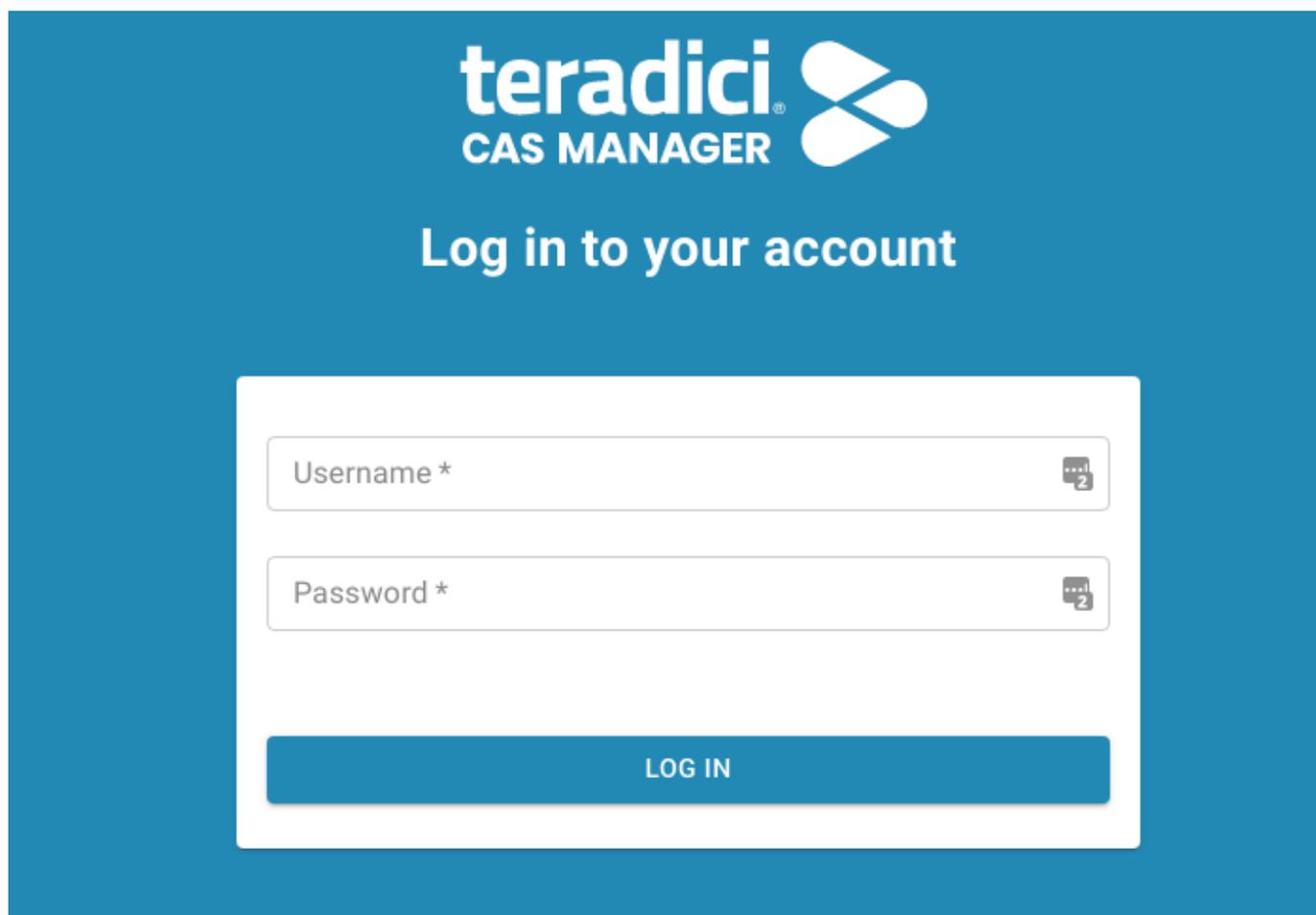
5. Access the Admin Console

The following section outlines how to access and unlock the Anyware Manager Admin Console.

1. Open a web browser and go to `https://{ip-address-or-dns-name-of-anyware-manager}`. This is the IP address of the target machine where Anyware Manager is installed.
2. When presented with the Anyware Manager Login page, use the following credentials to begin using Anyware Manager:

username: adminUser

password: The password that is configured during Anyware Manager installation.



1. Click **Login**.

You are now able to use Anyware Manager as the **adminUser** user.

To unlock the Admin Console enter your Anyware Software registration code into the Unlock dialog that appears when you first log-in. Anyware Manager will verify the registration code and then create a new deployment on your behalf. For further information on using the Admin Console, see [Admin Console](#).

6. Anyware Manager dnf Repo Management

By default, Anyware Manager will install any updates that are available, when you update all managed packages with the following command:

```
dnf upgrade anyware-manager
```

or

```
dnf update anyware-manager
```

This system wide update will include any new Anyware Manager version updates. If you do not want this system wide update, the Anyware Manager repo(s) should be disabled once installation is complete. The following section outlines how to lock the Anyware Manager in the dnf repo.

LOCKING ANYWARE MANAGER VERSION IN THE DNF REPO

The following command will lock the Anyware Manager version in the dnf repo:

```
sudo dnf config-manager --set-disabled teradici-anyware-manager*
```

You can confirm the settings by running the following command:

```
dnf repolist teradici-anyware-manager*
```

The output from this command should list the repo id, names and their status, as outlined in the example below:

```
repo id          repo
name            status
teradici-anyware-manager          teradici-anyware-
manager                disabled
teradici-anyware-manager-noarch   teradici-anyware-manager-
noarch                disabled
teradici-anyware-manager-source   teradici-anyware-manager-
source                disabled
```

Installing the Anyware Connector

Once you have installed the Anyware Manager you can install Anyware Connector(s) by following the instructions outlined in the [Installing the Connector](#) section.

Installing Anyware Manager - External Configuration

This section outlines how to install Anyware Manager and to configure an external database and secret storage. If you have already installed Anyware Manager with the default configuration you can skip this section.

With this configuration Anyware Manager supports high availability and scaling beyond a single virtual machine.

Installation Time

Installing and configuring Anyware Manager to run with an external database and secret storage should take roughly **2 hours** to complete. It should take a further **1 hour** to install the Connector.

Data Migration

Anyware Manager does not do any data migration when configuring your database and secret storage application. Any data stored when Anyware Manager is used with the default database and secret storage configuration, will not be transferred if the same Anyware Manager instance is re-configured to run with an external database and secret storage.

Firewall and Load Balancing Considerations

For information on firewall and load balancing ports connected to Anyware Manager and Connector, see [Firewall and Load Balancing Considerations](#)

Preparing the Anyware Manager Virtual Machine

The following section outlines how to prepare the system requirements, firewall configurations and proxy configurations on the Anyware Manager virtual machine:

System Requirements

You need to prepare a virtual machine that has the following requirements:

- Operating System: RHEL 8 and Rocky Linux 8.
- Minimum 8 GB RAM
- 4 CPU
- 60 GB Storage: If you are using LVM and `/var` is mounted on a separate volume, that volume must have 30GB or more in order for the installation to succeed and for Anyware Manager to function properly.
- Active Directory permissions set to **List contents** and **Read all properties**. If you do not set these permissions you will be unable to connect to specific remote workstations.
- The VM's hostname should be as per standards defined in **RFC1123** and it must:
 - Contain only 253 characters.
 - Contain only lowercase alphanumeric characters, '-' or '.'.
 - Start with an alphanumeric character.
 - End with an alphanumeric character.

Firewall Configuration

You must ensure your firewall is established and configured properly. Ensure port 443 is enabled in the firewall rules for the VM that Anyware Manager is running on.

Configure the firewall that the virtual network Anyware Manager is running by following the commands below:

1. Login to the Anyware Manager VM by ssh from a bash shell as *root*.
2. Check and confirm if `firewalld` is active by running the following command:

```
sudo systemctl status firewalld
```

3. If `firewalld` is active, follow the steps outlined below for firewall configuration. If `firewalld` is inactive, and your organization does not require firewall on the Anyware Manager VM, then skip the firewall configuration steps below and proceed to the remaining steps.

4. Run the following commands to configure the firewall:

```
sudo firewall-cmd --permanent --add-port=6443/tcp # virtual network flannel

sudo firewall-cmd --permanent --zone=trusted --add-source=10.42.0.0/16 # This
subnet is for the pods

sudo firewall-cmd --permanent --zone=trusted --add-source=10.43.0.0/16 # This
subnet is for the services

sudo firewall-cmd --reload
```

Proxy Configuration Variables

If HTTP/HTTPS proxy is used, then `HTTP_PROXY`, `HTTPS_PROXY` and `NO_PROXY` must be set. For `NO_PROXY`, specific IP addresses or domain names of service that are internal must be added. IP address ranges like "10.0.0.0/8" does not work; exact IP addresses or domain names must be used for `NO_PROXY` for the traffic to be routed through the proxy to work properly. The outlined variables need to be set in the `/etc/environment` file.

The following steps outline how to modify this file to add these variables:

1. Run the following command to edit the `/etc/environment/` file in vi. You could also use vim or nano:

```
sudo vi /etc/environment
```

2. Update the file to include the following environment variables.

```
HTTPS_PROXY="http://hostname_of_proxy:port"
HTTP_PROXY="http://hostname_of_proxy:port"
NO_PROXY=[list of all host names that should not go through the proxy, such
as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
ALL_PROXY="http://hostname_of_proxy:port"
https_proxy="http://hostname_of_proxy:port"
http_proxy="http://hostname_of_proxy:port"
no_proxy=""=[list of all host names that should not go through the proxy,
such as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
all_proxy="http://hostname_of_proxy:port"
```

3. Save the file. Once you install Anyware Manager you can configure it to use the proxy configuration. From this new terminal, proceed with the installation steps. The proxy configuration is implemented when Anyware Manager is installed.

Anyware Software Registration Code

Once you have a Anyware Software subscription HP will email a registration code to you. To contact sales and enquire about attaining a Anyware Software subscription, see [Contact Sales](#).

By default, Anyware Manager will install a database and secret storage on the same virtual machine. If you plan to use an external database and secret storage, which we recommend for scaling, continue with the steps outlined below to prepare the external database and secret store.

Preparing an External Database and Secret Storage

The following sections outline how to prepare a secret storage application and MongoDB that can be configured to work with Anyware Manager.

Verified Versions

The table below outlines the versions of MongoDB and Vault that are verified with Anyware Manager:

Anyware Manager Version	Vault Version	MongoDB Version
22.01	1.7.1	4.2.14
22.04	1.7.1	4.2.14
22.09	1.7.10	4.2.14
23.01	1.7.10	4.2.14
23.04	1.11.6	4.2.14

Preparing a Secret Storage Application

It is possible to use either Hashicorp Vault or Azure Key Vault, depending on your environment and needs, for secret and key encryption and storage with Anyware Manager. Once you have successfully installed Anyware Manager you will need to configure Anyware Manager to use the defined secret store. Please be aware that you can only configure one secret storage option with Anyware Manager.

The sections below outline the prerequisite steps required to prepare these secret stores:

- [Preparing Azure Key Vault](#)
- [Preparing Hashicorp Vault](#)

You can't configure the secret storage application to work with Anyware Manager until you have successfully installed Anyware Manager. Please complete the installation and then perform the required configurations.

Preparing an External Database

The following section provides guidelines and best practices involved when preparing and deploying a production MongoDB solution with Anyware Manager.

Reference Instructions for MongoDB and Vault Configuration

For detailed deployment instructions on installing and configuring MongoDB and Vault in a single virtual machine to be used by Anyware Manager, see the following [KB article](#). This KB article outlines in detail how to install and configure an instance of MongoDB and an instance of Vault on the same virtual machine. This KB article should be used in conjunction with the installation steps outlined in this section.

Reference Steps Only

All configuration steps outlined should be used as a reference only. For specific details, visit the vendor's official documentation and knowledge base. For information on the main reference list for MongoDB, see <https://docs.mongodb.com/manual/administration/>.

GUIDELINES AND BEST PRACTICES

The following are some of the guidelines and best practices that We encourage when deploying a MongoDB to work with Anyware Manager:

- Ensure the machine is deployed in a secure subnet with no public facing access.
- Ensure that the host firewalls are leveraged to control inbound and outbound traffic.
- MongoDB only needs to be accessible to the Anyware Manager and to administrators so it is better to be overly restrictive when granting access, and follow the rules of granting least privilege access.

- Anyware Manager cannot connect to an external MongoDB from behind a proxy.
- Remote desktop or SSH access to the system should be disallowed altogether if possible - realistically this is highly unlikely - or heavily restricted to essential users only, with a security-conscious configuration (e.g. add certificates for RDP, use passphrase-protected SSH keys and disallow password based authentication, change default SSH port, etc).
- Keep the host OS patched and up to date to ensure security fixes are deployed.
- It is best to use the latest stable version of MongoDB to ensure there are as few vulnerabilities, bugs, and issues as possible.
- It is best to maintain a regular update cadence for both MongoDB and the host machine in order to maintain latest security fixes.
- It is best to run MongoDB on a Long Term Support variant of Linux (ex, RHEL x86_64 or Ubuntu x86_64) VM.
- In order to maintain data integrity, it is best to run Mongo with Journaling enabled (enabled by default) in a geographically distributed [replica set](#).
- Regular backups are also important to ensure Anyware Manager can be restored in case of a crash. To keep MongoDB secure, it is important to create the appropriate admin accounts for granting access and ensuring that all communication is done over a secured TLS connect. Details for creating an appropriate service account can be found in the official [MongoDB documentaton](#), as well as:
 - Details for [enabling data encryption at rest](#).
 - How to [enable TLS on the MongoDB server](#).
 - Additional tips for [hardening the system](#).

Installing Anyware Manager

The following section outlines how to install Anyware Manager. These steps should be performed on the target machine by connecting via SSH or console.

System Requirements and Prerequisite Steps

Before installing Anyware Manager please ensure you have read through the system requirements, and configured the necessary prerequisites outlined above. Failure to do this will result in an unsuccessful installation of Anyware Manager.

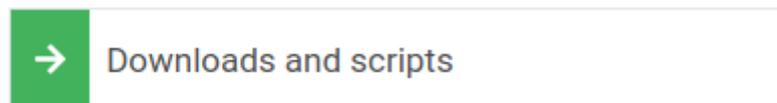
1. Add Anyware Manager Repository

The virtual machine you are adding the repo to must have access to the internet. If it doesn't, you will be unable to download and install the required files.

Anyware Manager Repositories

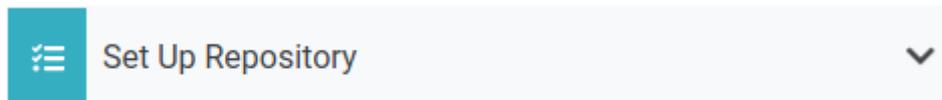
The new repository `teradici-anyware-manager` is introduced. If you currently have `teradici-cas-manager` repository, you must remove it. See [Repository Management](#) to remove them. Once the unwanted repos are removed, you can proceed with the installation process below.

1. To access the scripts and to configure and add the RHEL and Rocky Linux repository, select the **Downloads and scripts** option from the [Anyware Manager support site](#).



If you see a login button instead, click it to log into the site and then proceed.

2. Accept the End User License Agreement, then click **Set Up Repository**.



3. The window will expand and show the setup scripts for each supported operating system. Copy the command for your system to the clipboard.
4. Paste command on the target machine where you wish to install Anyware Manager and press `Enter`.

The command fetches a configuration script from our servers and runs it locally, setting up and configuring the repository on the local machine.

Run the following command to confirm `teradici-anyware-manager` repos were added into dnf repo.

```
dnf repolist --enabled teradici-anyware-manager*
```

The output from this command should list the repo id, names as outlined in the example below:

```
repo id                                repo name
teradici-anyware-manager-beta         teradici-anyware-
manager-beta
teradici-anyware-manager-beta-noarch  teradici-anyware-
manager-beta-noarch
teradici-anyware-manager-beta-source  teradici-anyware-
manager-beta-source
```

2. SELinux Configuration

SELinux policies are required for persistent storage and container logging on Anyware Manager. If SELinux policies are not found, data stored in Anyware Manager will be lost when the Anyware Manager Machine is shut down.

Once configured, and the installation has verified SELinux, all Anyware Manager related data will persist when the target machine hosting Anyware Manager is re-booted. To check if SELinux is already installed on your system, run the following command:

```
sudo dnf list installed | grep anyware-manager-selinux
```

The output from this command will notify if you if `selinux` is already running on your system. If it is not then you need to run the following commands to install the SELinux policies:

1. Run the following command to install the SELinux policies and set the basic framework for persistent database and Vault:

```
sudo dnf install -y selinux-policy-base container-selinux
```

2. Run the following command to install a specific version of SELinux that has been tested for K3s:

```
sudo dnf install -y https://github.com/k3s-io/k3s-selinux/releases/
download/v1.1.stable.1/k3s-selinux-1.1-1.el8.noarch.rpm
```

3. Run the following command to install SELinux from the Anyware Manager repo:

```
sudo dnf install -y anyware-manager-selinux
```

Install Command Alias

The older command `sudo dnf install -y cas-manager` works as an alias for Anyware Manager installation.

3. Install Anyware Manager

Installation Commands Updated

Anyware Manager installation requires two commands comparing to previous version where only one command is required. If you have automated the installation in scripting, make sure the script is updated accordingly.

Run the following command to install Anyware Manager RPM:

```
sudo dnf install -y anyware-manager
```

The installer installs Anyware Manager, as well as all external components required.

These external components are:

- k3s
- MongoDB (data store)
- Vault (secret store from HashiCorp)
- A self-signed SSL certificate for HTTPS access

Run the following command to install Anyware Manager with the appropriate flags suits your needs, see "Installation Flags and Options" for all supported flags. The command example below will install Anyware Manager with self-signed certificate from teradici-anyware-manager* repo added in the pervious steps. Debug level log will be outputted to help troubleshooting.:

```
sudo /usr/local/bin/anyware-manager install --accept-policies --self-signed --debug
```

PASSWORD CONFIGURATION

You need to configure a password to install Anyware Manager instance on your system. The password adds a layer of protection to the system and is required when accessing the Web Admin

Console. To meet the security standards, the password should be 8 characters in length with minimum 1 uppercase, 1 lowercase, 1 number and 1 special character.

Password Special Character

The `%` character and whitespaces are not supported.

Anyware manager installer requires Web Admin password and prompts for it, if this behavior is not preferred the password could be passed to the install command using:

```
--manager-admin-password
```

In case you forget the password, you can reset it using the following flag with the `configure` command:

```
--reset-admin-password
```

Password File

The `/opt/teradici/casm/temp-creds.txt` file that has the ability to store Anyware Manager password is not created any more by the installer. If you forget your password, you need to reset it using the `--reset-admin-password` flag.

INSTALLATION FLAGS AND OPTIONS

For detailed information on the installation flags and the configuration file parameters that you can pass during installation, see the table outlined below:

Flags	Example	Description
<code>--accept-policies</code>	<code>sudo /usr/local/bin/anyware-manager install --accept-policies</code>	If this flag is set, the installer does not prompt for accepting policies. This flag is optional
<code>--clear</code>	<code>sudo /usr/local/bin/anyware-manager install --clear</code>	This flag Removes data and files of an existing or previous Anyware Manager instance.
<code>--manifest</code>	<code>sudo /usr/local/bin/anyware-manager install --manifest</code>	This flag is set to provide a path for manifest files. This flag is optional.
<code>--self-signed</code>	<code>sudo /usr/local/bin/anyware-manager install --self-signed</code>	This flag is set to Automatically generate self-signed TLS cert and key. Setting this flag ignores <code>--tls-key</code> and <code>--tls-cert</code> flags.
<code>--tls-key</code>	<code>sudo /usr/local/bin/anyware-manager install --tls-key</code>	If this flag is set, it requires the full path and filename of the TLS key to use with the Anyware Manager.
<code>--tls-cert</code>	<code>sudo /usr/local/bin/anyware-manager install --tls-cert</code>	If this flag is set,it requires the full path and filename of the TLS certificate to use Anyware Manager.
<code>--registry</code>	<code>sudo /usr/local/bin/anyware-manager install --registry</code>	This flag is used to specify the container registry from which the Anyware Manager pulls container images.
<code>--registry-username</code>	<code>sudo /usr/local/bin/anyware-manager install --registry-username</code>	This flag is used to authenticate Anyware Manager username to the registry and to pull container images.
<code>--registry-password</code>	<code>sudo /usr/local/bin/anyware-manager install --registry-password</code>	This flag is used to authenticate Anyware Manager password to the registry to pull container images.
<code>--manager-admin-password</code>	<code>sudo /usr/local/bin/anyware-manager install --manager-admin-password</code>	This flag is used to create a new password for Anyware Manager during installation.
<code>--reset-admin-password</code>	<code>sudo /usr/local/bin/anyware-manager configure --reset-manager-password</code>	This flag is used to reset the password for Anyware Manager.

These external components are:

- k3s
- A self-signed SSL certificate for HTTPS access

The installation process takes 5-10 minutes to complete, depending on your network connection speed and other environment variables. During this process, Anyware Manager is running a health check every 15 seconds to confirm that all required services are deployed and running successfully before reporting that the installation is complete.

Once the installation has been successful you should see a message stating **Anyware Manager installation complete**. The IP address of your Anyware Manager instance will also be displayed. The Anyware Manager version that has been installed will also be displayed.

If the installation appears unhealthy, you should generate a support bundle and send this to HP for investigation. For more information on generating a support bundle, see [Support Bundle](#). For more information on monitoring and assessing the health status of Anyware Manager, see [Health Status](#).

Generated Self-Signed Certificates

The installer will automatically generate several certificates to ensure that internal communication within the Anyware Manager and communication to the Anyware Manager itself are done over encrypted TLS connections. These certificates will be automatically generated as needed when Anyware Manager is initially installed or when upgrades are done. If for whatever reason you do not wish to upgrade, certificates will need to be periodically renewed, see [TLS Certificates](#) for steps on how to do this.

4. Configure Anyware Manager to use Proxy

The following section outlines the steps involved in enabling the proxy configuration with Anyware Manager:

1. If the proxy environment variables were not set before installing Anyware Manager, please see the [Proxy Configuration Variables](#) section above for the steps involved in setting these variables. If you already have these variables set, continue to step 2.
2. Establish a new ssh/shell session.

3. Configure Anyware Manager to use the proxy configuration by running the following command:

```
sudo /usr/local/bin/anyware-manager configure --enable-proxy
```

5. Configure Anyware Manager to use a Secret Storage Application

Once you have successfully installed Anyware Manager you must configure it to use the secret store you prepared in the prerequisite steps prior to installing Anyware Manager. You need to have prepared the selected secret storage application before installing Anyware Manager, as outlined in the [Preparing a Secret Storage Application](#) section above. For information on how to configure Anyware Manager to work with these secret stores, see the following sections based on what type of secret storage you prepared:

- [Configuring Anyware Manager with Azure Key Vault](#)
- [Configuring Anyware Manager with Hashicorp Vault](#)

6. Configure Anyware Manager to use MongoDB

Once you have successfully installed Anyware Manager you must configure it to use the external MongoDB you prepared in the prerequisite steps prior to installing Anyware Manager.

The following section outlines how to configure Anyware Manager to use MongoDB:

1. SSH to your target machine where you installed Anyware Manager.
2. Create a file that contains the following data:

```
{
  "db-connection-string": "mongodb://<username>:<password>@<address>/
<db_name>",
  "db-enable-tls": true,
  "db-skip-verify-cert": false
}
```

⚠ URL Encoding

If the username or password contain any of the following special characters: /, ?, #, [], @, %, those characters must be converted using URL encoding in the MongoDB connection string. For example, if you defined user 'awmuser' with password 'Password%' in MongoDB, then in Anyware Manager the `db-connection-string` for MongoDB would look like this:

```
mongodb://awmuser:Password%25@ip_of_mongodb:27017/name_of_mongodb
```

If you require more characters to be encoded, or want to test encoding or decoding your data, see <https://www.urlencoder.org/>.

3. Replace the following place holders with your own values:

- `username`: Username of the MongoDB user that Anyware Manager will authenticate MongoDB requests.
- `password`: Password for the MongoDB user referenced in "username".
- `address`: Address to the MongoDB server.
- `db_name`: Name of the MongoDB database that Anyware Manager will use. Note that if no db name is specified, the db named "test" will be used.

4. Run the following command to configure Anyware Manager to use MongoDB:

```
sudo /usr/local/bin/anyware-manager configure --config-file path-to-your-config-file
```

⚠ MongoDB Database Name

If no database name is provided as part of the connection string, a default name "test" will be used instead, for example:

`db-connection-string:"mongodb://user:pass@mongo:27017/` will result in the creation of a database with the name "test".

If you provided a database name then that will be used, for example:

`db-connection-string:"mongodb://user:pass@mongo:27017/awm_db` will result in "awm_db" being used as the name.

After running this command, Anyware Manager will validate the configuration by attempting to query the MongoDB server. If the request is successful, then Anyware Manager will be configured to use this MongoDB. The configure command should only take a few minutes to complete.

Here's an example of creating a user for the Anyware Manager Database "awm_db"

```
use awm_db
db.createUser(
  {
    user: "anyware",
    pwd: passwordPrompt(), // or cleartext password
    roles: [ {db: "awm_db", role:"readWrite"} ], // user only needs readWrite
    Access to awm DB,
    authenticationRestrictions: [
      {
        clientSource: [
          "<AWM-IP>", // IP address of the AWM Host
          "10.42.0.0/24" // Subnet for the AWM pods
        ],
        serverAddress: ["<MongoDB IP>"] // IP for the MongoDB server
      }
    ],
  }
)
```

The connection string for this user would be:

```
mongodb://anyware-manager:<password>@<MongoDB IP>/awm_db
```

Configuration Templates

HP provides configuration template files and parameters that can be generated and used when configuring your MongoDB, see [Configuration Templates](#).

6.1 CONNECTING A MONGODB WITH SELF-SIGNED TLS CERTIFICATES

Anyware Manager allows for the option to provide a database connection string, a flag to enable/disable TLS, a flag to enable/disable TLS cert validation, and also provide a custom Certificate Authority certificate for the MongoDB Server certificate. This is only recommended during proof-of-concept testing. In this mode, TLS must be enabled and certificate validation must be carried out. A server certificate signed by a public Certificate Authority is also highly recommended.

⚠ Tested on CentOS Only

The following steps have been tested on CentOS. These steps may not work, or work differently, on different systems.

The following steps outline how to connect a MongoDB that uses self-signed TLS certificates:

1. SSH to your target machine where you installed Anyware Manager.
2. Create a file that contains the following data:

```
{
  "db-connection-string": "mongodb://<username>:<password>@<address>/
<db_name>",
  "db-enable-tls": true,
  "db-ca-cert-file": "/path/to/mongo/TLS/custom/certificate/authority",
  "db-skip-verify-cert": false
}
```

3. Replace the following place holders with your own values:

- "db-connection-string": Follow the same guidelines as mentioned above.
- "db-ca-cert-file": Path to MongoDB's custom Certificate Authority's public certificate, in PEM format, if one is used. This is only required to validate self-signed certificates or certificates signed by a non-public Certificate Authority.

4. Run the following command to configure Anyware Manager to use MongoDB:

```
sudo /usr/local/bin/anyware-manager configure --config-file path-to-your-
config-file
```

5. If you want to skip certificate verification, include `"db-skip-verify-cert": true` in your configuration file. Please note that this is not secure and is not recommended for production use cases:

```
{
  "db-connection-string": "mongodb://<username>:<password>@<address>/
<db_name>",
  "db-enable-tls": true,
  "db-ca-cert-file": "/path/to/mongo/TLS/custom/certificate/authority",
  "db-skip-verify-cert": true
}
```

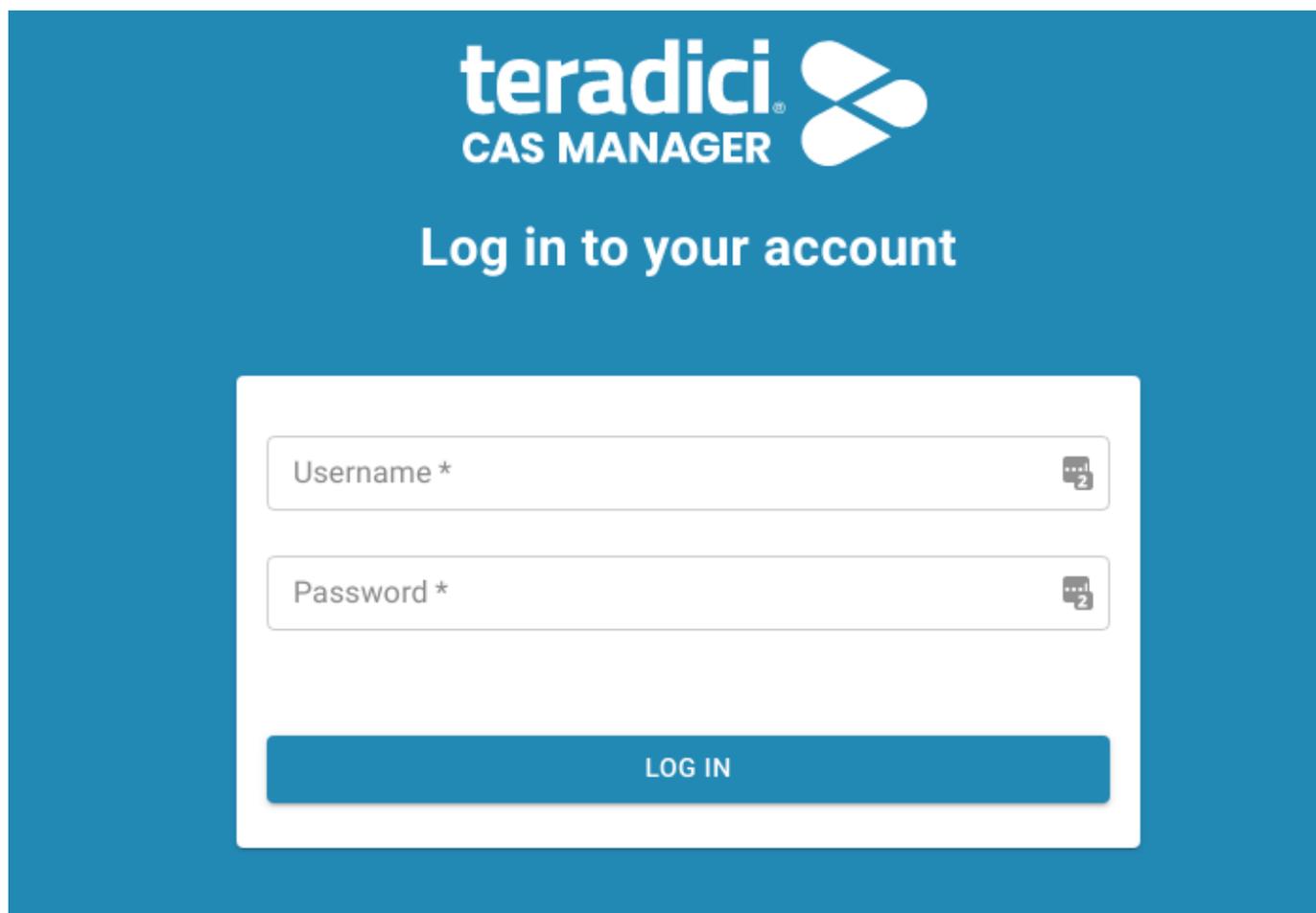
7. Accessing the Admin Console

The following section outlines how to access and unlock the Anyware Manager Admin Console.

1. Open a web browser and go to `https://{ip-address-or-dns-name-of-anyware-manager}`. This is the IP address of the target machine where Anyware Manager is installed.
2. When presented with the Anyware Manager Login page, use the following credentials to begin using Anyware Manager:

username: adminUser

password: The password that is configured during Anyware Manager installation.



1. Click **Login**.

You are now able to use Anyware Manager as the **adminUser** user.

To unlock the Admin Console enter your Anyware Software registration code into the Unlock dialog that appears when you first log-in. Anyware Manager will verify the registration code and then create

a new deployment on your behalf. For further information on using the Admin Console, see [Admin Console](#).

8. Anyware Manager dnf Repo Management

By default, Anyware Manager will install any updates that are available, when you update all managed packages with the following command:

```
dnf upgrade anyware-manager
```

or

```
dnf update anyware-manager
```

This system wide update will include any new Anyware Manager version updates. If you do not want this system wide update, the Anyware Manager repo(s) should be disabled once installation is complete. The following section outlines how to lock the Anyware Manager in the dnf repo.

LOCKING ANYWARE MANAGER VERSION IN THE DNF REPO

The following command will lock the Anyware Manager version in the dnf repo:

```
sudo dnf config-manager --set-disabled teradici-anyware-manager*
```

You can confirm the settings by running the following command:

```
dnf repolist teradici-anyware-manager*
```

The output from this command should list the repo id, names and their status, as outlined in the example below:

repo id	repo
name	status
teradici-anyware-manager	teradici-anyware-
manager	disabled
teradici-anyware-manager-noarch	teradici-anyware-manager-
noarch	disabled
teradici-anyware-manager-source	teradici-anyware-manager-
source	disabled

Installing the Connector

Once you have installed the Anyware Manager you can install Connector(s) by following the instructions outlined in the [Installing the Connector](#) section.

Installing Anyware Manager - Darksite Installation

In cases where Anyware Manager needs to be installed in a **darksite** (ie, an environment where there is no internet access, also known as **airgap** or **offline** environment) you will need to download the darksite dependency files, transfer them to the target darksite machine, and then run the darksite installation script.

Legacy Scripts and Tarball Files

Before you install a new darksite version of Anyware Manager, you must remove all legacy Anyware Manager scripts and tarball files.

Prerequisite Steps

Follow the prerequisite steps outlined here: [Anyware Manager System Requirements](#) to prepare your target machine. It is important to read and address all the prerequisites outlined. Once you have completed these steps and prepared the target machine, return to this page and continue with the installation.

RHEL/Rocky Linux OS version

For Anyware Manager Darksite installation, the minimum RHEL/Rocky Linux operating system version is 8.7.

Download and Transfer Dependencies

Once you have addressed all the prerequisite steps, you need to download and transfer the dependencies files.

The combined dependencies will take up 2.2 GB approximately. You must ensure you have a media device that can transfer all required components to the target darksite virtual machine; these

components can be removed from the target virtual machine once installation is complete. The required packages and dependencies to complete a darksite installation are:

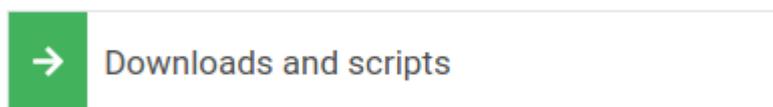
- Darksite installation bash script: A bash script that will set up and install required components as well as the Anyware Manager.
- RedHat Package Manager (RPM) dependencies: A yum repo that contains all RPM dependencies required to install Anyware Manager. Only the dependencies that are missing will be installed but this package contains all system requirements.
- Anyware Manager container images: A `.tar.gz` file containing all Anyware Manager container images required for running the Anyware Manager to be loaded onto the system.

All of the packages and dependencies are bundled in a tar archive file.

1. Downloading the File

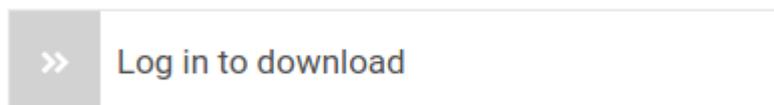
Once you have access to a virtual machine with internet access, download the darksite installation package directly as a `tar.gz` file from [Anyware Manager product release](#) and follow the steps below:

- Click the **Downloads and scripts** button.



Note: An account is required

If you are not logged in, you will see a log in prompt instead:



You can create an account when you click this button if you do not already have one.

- Read and accept the HP End User License Agreement.
- To download the darksite package, click **Download linux** Under **Darksite packages**.

2. Transferring the File

Once you have downloaded the `.tar.gz` file, transfer it to the target darksite machine. For system requirements of the target virtual machine, see [here](#).

To transfer the file you can copy it onto a media device, such as a USB drive or a DVD, and then connect that device to the target darksite machine. You can also connect the target darksite machine to another machine via SSH or FTP, and complete a network file transfer. This method may not be viable for some darksite networks.

3. Extracting the File

Once the `.tar.gz` file has been transferred to the target darksite machine, extract the downloaded file by running the following command:

```
sudo tar xzvf anywhere-manager-offline_Linux.tar.gz
```

That creates a new folder called `anywhere-manager-offline_VERSION_linux`.

Change drive on the command prompt into the new folder. You can see two files, one is the dependency tarball file and the other is the install bash script file.

4. Install Anyware Manager Darksite

Checking and Removing Anyware Manager Repository Files

Anyware Manager Darksite doesn't need to download images from online repository, this usually works as expected on a clean VM without additional step here. However, if there is repository set by the flags or repository file, the installer will try to download from what the target is set to. To avoid this you must make sure the relevant repository files are removed from the VM.

- To check if the repository present in the system, run `sudo ls -la /etc/yum.repos.d`
- If you have any repository name that start from *teradici-anyware-manager*, you need to remove them by running `sudo rm /etc/yum.repos.d/NAME_OF_THE_REPO`.

Run the following command for the installation:

```
sudo ./install.sh
```

Enter Admin Password

After executing this command, please enter the admin password for Anyware Manager When prompted.

This installs the Anyware Manager and all the other dependencies.

The command above will replace steps 1-3 in either the [External Configuration](#) or [Default Configuration](#) installation steps. Please follow the steps after this with the configuration you wish to use.

Installation Errors

The Darksite installation could fail due to a package conflicting or checksum error if there is an existing package already present on the target machine. To resolve this, you need to delete the conflicting package and re-run the installation script.

5. Upgrading Anyware Manager to version 23.01 and later (Optional)

If you have Anyware Manager 22.09 installed then upgrading to Anyware Manager 23.01 and later, requires you to perform a series of additional steps. They are as follows:

1. Perform all actions in step 1 to step 4 mentioned above.

Installation Warning Message

After performing step 4, the system displayed a warning message that says *An instance of Anyware Manager is installed or previous data is still on disk, if you would like to upgrade you need to run the upgrade command instead, but if you would like to remove and install a new instance you will need to pass `--clear` to the install command.*

2. To complete the installation process, run the `anyware-manager upgrade` command.

The upgrade and install is now successful.

Upgrading Anyware Manager (Online Upgrade)

When upgrading Anyware Manager there are two options available.

1. **In-place upgrade within the maintenance window:** You can run an in-place upgrade through dnf for Anyware Manager. Depending on the configuration you implemented, this will mean a period of downtime which can range from a few seconds to a few minutes.
2. **Zero downtime upgrade via a new VM.** The second option involves installing Anyware Manager on a new virtual machine, and configuring it to connect to the same external database and secret storage. If done correctly this can result in zero downtime.

The steps involved in both options are outlined below.

Which Option Should I Choose?

The upgrade option you choose depends on the amount of downtime you are willing to experience and how your Anyware Manager instance has been deployed and setup. The following are some use cases that outline which option to use:

- If you have a single Anyware Manager server connecting to external database and secret storage, it is recommended to install Anyware Manager on a new virtual machine. If you don't have a new virtual machine then run the in-place upgrade on the existing virtual machine with the understanding that there will be some downtime during this upgrade.
- If you have multiple Anyware Manager servers connecting to the same external database and secret storage, it is recommended to run an in-place upgrade on each Anyware Manager server, one at a time. There should not be any downtime as long as one Anyware Manager server is up and running.
- If the database and secret storage is on the same virtual machine as Anyware Manager, you must run an in-place upgrade. This is to ensure that the data persists after the upgrade has been completed. There will be some downtime during this upgrade.

Running an In-Place Upgrade

Anyware Manager Downtime

The Anyware Manager virtual machine that is undergoing an in-place upgrade will not be available during the upgrade. This can take anywhere from a few seconds to a few minutes, depending on the number of services that need to be upgraded and the speed of download when retrieving new versions from the repo. If this is the only Anyware Manager server you have, the new connections will not be established until the upgrade is completed successfully.

Anyware Manager Repositories

The new repository `teradici-anyware-manager` is introduced. If you currently have `teradici-cas-manager` repository, you must remove it. See [Repository Management](#) to remove them. Once the unwanted repos are removed, you can proceed with the update process.

1. Add Anyware Manager dnf Repository

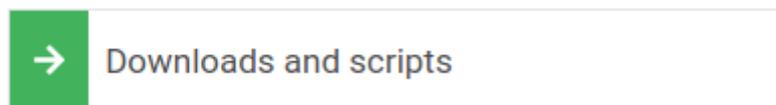
1. SSH to the Anyware Manager virtual machine.
2. Remove the existing dnf repo for previous CAS Manager with the following command.

```
sudo rm /etc/yum.repos.d/teradici-anyware-manager.repo
```

3. Check that the repos are removed

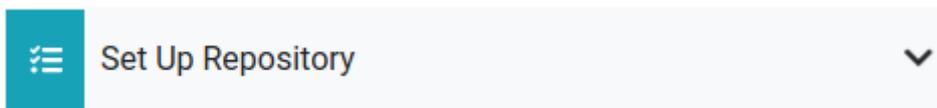
```
dnf repolist --enabled teradici-anyware-manager*
```

4. To access the scripts and to configure and add the RHEL and Rocky Linux repository, select the **Downloads and scripts** option from the [Anyware Manager support site](#).



If you see a login button instead, click it to log into the site and then proceed.

5. Accept the End User License Agreement, then click **Set Up Repository**.



6. The window will expand and show the setup scripts for each supported operating system. Copy the command for your system to the clipboard.
7. Paste command on the target machine where you wish to install Anyware Manager and press `Enter`.

The command fetches a configuration script from our servers and runs it locally, setting up and configuring the repository on the local machine.

Run the following command to confirm `teradici-anyware-manager` repos were added into `dnf` repo.

```
dnf repolist --enabled teradici-anyware-manager*
```

The output from this command should list the repo id, names as outlined in the example below:

```
repo id                                repo name
teradici-anyware-manager-beta          teradici-anyware-
manager-beta
teradici-anyware-manager-beta-noarch   teradici-anyware-
manager-beta-noarch
teradici-anyware-manager-beta-source   teradici-anyware-
manager-beta-source
```

2. Upgrade Anyware Manager via dnf

To upgrade CAS Manager 22.04 or prior to Anyware Manager, transitional steps are required so that Anyware Manager can recognize CAS Manager as the predecessor instead of thinking Anyware Manager is in conflict. Otherwise, you would see an error message as shown below:

```
Error:
Problem: problem with installed package cas-manager-22.04.0-0.el8.x86_64
- package anyware-manager-22.09.0-0.rc3+7.g4cfd247.326.el8.x86_64 conflicts with cas-manager <= 22.04.0 provided by cas-manager-22.04.0-0.el8.x86_64
- package anyware-manager-22.09.0-0.rc3+7.g4cfd247.326.el8.x86_64 obsoletes cas-manager >= 22.07.0 provided by cas-manager-22.07.0-0.rc6+1.g6cc6a68.1.el8.x86_64
- package anyware-manager-22.09.0-0.rc3+7.g4cfd247.326.el8.x86_64 conflicts with cas-manager <= 22.04.0 provided by cas-manager-22.01.0-0.el8.x86_64
- package anyware-manager-22.09.0-0.rc3+7.g4cfd247.326.el8.x86_64 conflicts with cas-manager <= 22.04.0 provided by cas-manager-21.10.0-1216.el8.x86_64
- package anyware-manager-22.09.0-0.rc3+7.g4cfd247.326.el8.x86_64 conflicts with cas-manager <= 22.04.0 provided by cas-manager-21.07.0-1017.el8.x86_64
- conflicting requests
(trial to add '--allowrasing' to command line to replace conflicting packages or '--skip-broken' to skip uninstalleable packages or '--nobest' to use not only best candidate packages)
```

Please follow the steps below to upgrade from CAS Manager 22.04 or prior versions:

1. Upgrade CAS Manager 22.04 RPM or prior to CAS Manager 22.07.0 RPM, which is the transitional version, by running the following command:

```
sudo dnf install cas-manager-22.07.0
```

2. Install latest version of Anyware Manager RPM by running the following command:

```
sudo dnf install anyware-manager
```

3. Upgrade to Anyware Manager by running the following command:

```
sudo /usr/local/bin/anyware-manager upgrade
```

If you want to use a different manifest than the default one, please add `--manifest` and the path to your manifest.

For EX: `sudo /usr/local/bin/anyware-manager upgrade --manifest path-to-manifest.tar.gz`

Installing Anyware Manager on a new Virtual Machine

The following steps outline how to install Anyware Manager on a new virtual machine, and configure it to connect to the same external database and secret storage application:

1. Before performing an upgrade you should backup the database and secret storage application you used when installing Anyware Manager. If you intend to install Anyware Manager on a new virtual machine, backup the configuration file so that it can be used on the Anyware Manager instance.
2. Follow the installation steps outlined [here](#) to install a new instance of Anyware Manager in a new virtual machine to replace the existing one. You must configure it to be identical to the old Anyware Manager instance. It needs to connect to the same MongoDB, and secret storage application, as well as having the same certificate and network configurations.
3. Change your DNS to point to the new Anyware Manager instance.

4. Reconfigure your Connector to connect to the new Anyware Manager if necessary:

- If you installed your Connector with `--manager-url=https://Fully-Qualified-Domain-Name-of-Anyware-manager:`

- Change your DNS entry for the FQDN to point to the new Anyware Manager's static IP.
- In the Connector virtual machine, flush the DNS cache to use the latest DNS. This ensures that there will be zero downtime as the Connector will be able to connect to the new Anyware Manager instance:

```
sudo systemd-resolve --flush-caches
```

- If you installed your Connector with `--manager-url=https://ip-address-of-anyware-manager:`

- Update your Connector to use the latest Anyware Manager's IP address.
- Log into the Connector virtual machine and run the following command to update the Anyware Manager IP:

```
sudo usr/sbin/cloud-access-connector update --manager-url https://  
<New Anyware-Manager IP>
```

5. In the Connector, ping the FQDN to verify it can find the new Anyware Manager instance.

6. Remove the old Anyware Manager virtual machine.

Removing the Anyware Manager Virtual Machine

The following steps outline how to remove the Anyware Manager virtual machine:

1. Save the configuration setting files used in the current version of Anyware Manager. For example, save them as a *all-configurations.json* file. If the current Anyware Manager has proxy configured, save all the proxy environment variables also.
2. Run the following commands to remove the Anyware Manager.

```
sudo dnf remove -y anyware-manager-selinux anyware-manager  
sudo rm -rf /opt/teradici/casm # Remove the cas-manager files
```

3. Delete the Anyware Manager VM.

Upgrading Anyware Manager (Darksite Upgrade)

In cases where Anyware Manager needs to be updated in a **darksite** (ie, an environment where there is no internet access, also known as **airgap** or **offline** environment) you will need to download the darksite dependency files, transfer them to the target darksite machine, and then run the darksite installation script.

Legacy Scripts and Tarball Files

Before you upgrade to a new darksite version of Anyware Manager, you must remove all legacy Anyware Manager scripts and tarball files.

Prerequisite Steps

Follow the prerequisite steps outlined here: [Anyware Manager System Requirements](#) to prepare your target machine. It is important to read and address all the prerequisites outlined. Once you have completed these steps and prepared the target machine, return to this page and continue with the installation.

RHEL/Rocky Linux OS version

For Anyware Manager Darksite installation, the minimum RHEL/Rocky Linux operating system version is 8.5.

Download and Transfer Dependencies

Once you have addressed all the prerequisite steps, you need to download and transfer the dependencies files.

The combined dependencies will take up 2.2 GB approximately. You must ensure you have a media device that can transfer all required components to the target darksite virtual machine; these

components can be removed from the target virtual machine once installation is complete. The required packages and dependencies to complete a darksite installation are:

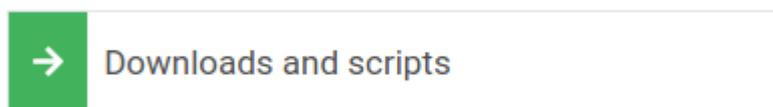
- Darksite installation bash script: A bash script that will set up and install required components as well as the Anyware Manager.
- RedHat Package Manager (RPM) dependencies: A yum repo that contains all RPM dependencies required to install Anyware Manager. Only the dependencies that are missing will be installed but this package contains all system requirements.
- Anyware Manager container images: A `.tar.gz` file containing all Anyware Manager container images required for running the Anyware Manager to be loaded onto the system.

All of the packages and dependencies are bundled in a tar archive file.

1. Downloading the File

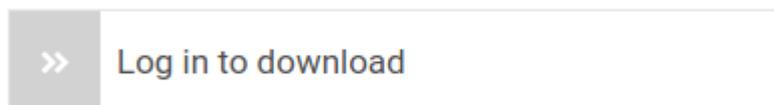
Once you have access to a virtual machine with internet access, download the darksite installation package directly as a `tar.gz` file from [Anyware Manager product release](#) and follow the steps below:

- Click the **Downloads and scripts** button.



Note: An account is required

If you are not logged in, you will see a log in prompt instead:



You can create an account when you click this button if you do not already have one.

- Read and accept the HP End User License Agreement.
- To download the darksite package, click **Download linux** Under **Darksite packages**.

2. Transferring the File

Once you have downloaded the `.tar.gz` file, transfer it to the target darksite machine. For system requirements of the target virtual machine, see [here](#).

To transfer the file you can copy it onto a media device, such as a USB drive or a DVD, and then connect that device to the target darksit machine. You can also connect the target darksite machine to another machine via SSH or FTP, and complete a network file transfer. This method may not be viable for some darksite networks.

3. Extracting the File

Once the `.tar.gz` file has been transferred to the target darksite machine, extract the downloaded file by running the following command:

```
sudo tar xzvf anyware-manager-offline_Linux.tar.gz
```

That creates a new folder called `anyware-manager-offline_VERSION_linux`.

Change drive on the command prompt into the new folder. You can see two files, one is the dependency tarball file and the other is the install bash script file.

4. Upgrade using Anyware Manager Darksite

4. A. UPGRADE FROM CAS MANAGER TO ANYWARE MANAGER

Updating from CAS Manager to Anyware Manager

This step is only required when updating from an older CAS Manager version to a new Anyware Manager version. You can skip this step if it does not match your use case.

1. Unpack the `anyware-manager-offline-deps.tar.gz` by running the following command in order to run the transitional commands:

```
$ sudo tar zxvf anyware-manager-offline-deps.tar.gz
```

1. Run the installation of the transition CAS Manager in the following order:

```
$ sudo dnf install -y --disablerepo=* anyware-manager/cas-manager-k3s.rpm
$ sudo dnf install -y --disablerepo=* anyware-manager/cas-manager-selinux.rpm
$ sudo dnf install -y --disablerepo=* anyware-manager/cas-manager.rpm
```

4. B. INSTALL ANYWARE MANAGER DARKSITE

Checking and Removing Anyware Manager Repository Files

Anyware Manager Darksite doesn't need to download images from online repository, this usually works as expected on a clean VM without additional step here. However, if there is repository set by the flags or repository file, the installer will try to download from what the target is set to. To avoid this you must make sure the relevant repository files are removed from the VM.

- To check if the repository present in the system, run `sudo ls -la /etc/yum.repos.d`
- If you have any repository name that start from `_teradici-anyware-manager_`, you need to remove them by running `sudo rm /etc/yum.repos.d/NAME_OF_THE_REPO.`

Run the following command for the installation:

```
sudo ./install.sh
```

 **Enter Admin Password**

After executing this command, please enter the admin password for Anyware Manager When prompted.

This sets up the Anyware Manager and all the other dependencies.

Run the following command to update Anyware Manager:

```
$ sudo /usr/local/bin/anyware-manager upgrade
```

The command above will replace steps 1-3 in either the [External Configuration](#) or [Default Configuration](#) installation steps. Please follow the steps after this with the configuration you wish to use.

Customizing Anyware Manager

Configuration Template Files and Parameters

The following section outlines the configuration template files and parameters available with Anyware Manager.

Configuration Template Files

The following section outlines how to generate template files that can be used to fill in various Anyware Manager configurations:

1. SSH to your machine where you installed Anyware Manager.
2. Run one of the following commands listed in the code block below to generate configuration template files:

```
# Generate the following config templates: mongo-template.json
sudo /usr/local/bin/anyware-manager generate --mongo

# Generate the following config templates: tls-template.json
sudo /usr/local/bin/anyware-manager generate --tls

# Generate the following config templates: vault-template.json
sudo /usr/local/bin/anyware-manager generate --vault

# Generate the following config templates: all-templates.json, mongo-
template.json, tls-template.json, vault-template.json
sudo /usr/local/bin/anyware-manager generate --all-templates
```

Configuration Parameters

The following table contains all of the parameters that can be used in a configuration file to configure Anyware Manager.

Parameter	Type	Description	Required
vault-type	string	Specifies the type of secret store that Anyware Manager should use. Currently, "vault" is the only supported value for this parameter.	Required for updating Vault configuration.
vault-url	string	URL of the Vault server.	Required for updating Vault configuration.
vault-secret-path	string	Vault secret path where secrets are stored.	Required for updating Vault configuration.
vault-token	string	Token used to authenticate requests to the Vault server.	Required for updating Vault configuration.
vault-ca-cert-file	string	Path to the file containing a PEM-formatted CA certificate that will be used to validate the Vault server's certificate.	Required if the Vault server is using self-signed certificates.
vault-skip-verify-cert	boolean	If true, Anyware Manager will not validate the Vault server's TLS certificate. This is not secure and is not recommended for production deployments.	Not required. Defaults to "false".
db-connection-string	string	URL of the MongoDB server.	Required for updating MongoDB configuration.
db-enable-tls	boolean	If false, requests to MongoDB will not be encrypted. Setting this parameter to false is not secure and is not recommended for production deployments.	Not required. Defaults to "true".
db-skip-verify-cert	boolean	If true, Anyware Manager will not validate the MongoDB server's TLS certificate. This is not secure and is not recommended for production deployments.	Not required. Defaults to "false".
db-ca-cert-file	string	Path to the file containing a PEM-formatted CA certificate that will be used to validate the MongoDB server's certificate.	Required if the MongoDB server is using self-signed certificates.

Parameter	Type	Description	Required
tls-key-file	string	Path to the file containing a PEM-formatted TLS key that will be used by Anyware Manager.	Required for updating TLS certificates used by Anyware Manager.
tls-cert-file	string	Path to the file containing PEM-formatted TLS certificate that will be used by Anyware Manager.	Required for updating TLS certificates used by Anyware Manager.
skip-validate-reg-code	boolean	If true, skip validating PCoIP registration code when creating or updating a deployment.	Not required unless Anyware Manager is blocking all internet traffic. Defaults to "false".

Configuring Custom TLS Certificates

By default, Anyware Manager is deployed using self-signed TLS certificates. We recommend using a custom TLS certificate for using Anyware Manager in production. You should renew and maintain these certificates as required. Anyware Manager supports X509 certificates in PEM format, the certificate file must only include a single certificate, the CA bundle is not supported. The TLS key must not require Password.

To configure Anyware Manager to use custom TLS certificates, or to update Anyware Manager to use a new TLS certificate, follow the steps outlined below:

1. Create a file called *tls-config.json* with the following contents:

```
{
  "tls-key-file": "<path to a file containing your TLS certificate key>",
  "tls-cert-file": "<path to a file containing your TLS certificate>"
}
```

2. Update the TLS configuration by running the following command:

```
sudo /usr/local/bin/anyware-manager configure --config-file tls-config.json
```

This command will update the Anyware Manager services automatically, and this will take a few minutes to complete.

Internal TLS Certificates

When you are using internal MongoDB and Vault for data storage, in order to keep Anyware Manager's internal communication secure, the installer will also generate a set of self-signed TLS certificates to be used for encrypting internal communication within Anyware Manager. By default these certificates will expire 2 years from when they are generated.

In order to ensure that the Anyware Manager uptime is not interrupted unexpectedly it is important to ensure that these certificates do not expire. This can be done by:

- Upgrading Anyware Manager regularly. These certificates will be regenerated by the installer during the upgrade process if they are close to expiring so upgrading at a regular cadence (eg, once or twice a year) will ensure everything remains operational.

- If you do not want to upgrade Anyware Manager and only want to use a version that you have qualified yourself, and that may exceed the TLS certificates expiration time, you can either:
 - Periodically re-deploy the Anyware Manager instance you are running so that new certificates are generated regularly.
 - Run the command to re-generate certificates periodically. See [Internal Certificate Generation](#) below for steps on how to do this.
- Monitor when the certificates are going to expire and plan to regenerate them beforehand. You can do this by either running the Anyware Manager diagnose command or checking the Anyware Manager health probe's logs. Run the following command to generate this health check:

```
/usr/local/bin/anyware-manager diagnose --health
```

This health check will assess the Mongo Database and Vault connections. A warning message will be logged if the certificates are close to expiring and an error will be logged if they have expired. For example,

```
...
INFO .. Connections:
INFO .... MongoDB=Healthy
WARN ..... Mongo Certificate Valid From=2021-08-17 19:35:42 Mongo
Certificate Valid Until=2021-09-18 19:35:42
INFO .... vault=Healthy
WARN ..... Vault Certificate Valid From=2021-08-17 19:35:42 Vault
Certificate Valid Until=2021-09-18 19:35:42
...
```

In order to check the logs for the Anyware Manager health probe, run

```
/usr/local/bin/kubectl get jobs -o jsonpath='{.items[?
(@.spec.template.metadata.labels.name=="manager-health-
probe")].metadata.name}' --sort-by=.metadata.creationTimestamp | rev | cut -
d' ' -f 1 | rev | xargs -I % /usr/local/bin/kubectl logs jobs/%
```

This command will return the last completed Anyware Manager health probe's logs and will state when the certificates will be expiring. For example:

```
Secret Provider type is Vault
Vault certificate is valid from Tue Aug 17 19:35:42 2021 until Sat Sep 18
19:35:42 2021
Vault status - Initialized: True, Sealed: False
Vault is healthy
MongoDB certificate is valid from Tue Aug 17 19:35:42 2021 until Sat Sep 18
19:35:42 2021
MongoDB is healthy
Manager is healthy
```

These commands will show the expiration date for the Mongo Database and Vault in both the default MongoDB/Vault mode or external MongoDB/Vault mode. For external MongoDB/Vault modes, you need to manually change the certificates yourself on the external instances since Anyware Manager does not have the necessary permissions or functionality to do that for you.

INTERNAL CERTIFICATE GENERATION

In the case where the certificate has expired or is about to expire, and you do not wish to upgrade your Anyware Manager instance, you can generate internal certificates by running the following command:

```
/usr/local/bin/anyware-manager configure --generate-certs
```

Once you have run this command, check the output of the diagnostics health command or the Anyware Manager health probe as shown in point 3 above. Please note that this will only update the certificates within Anyware Manager, so if you are using an external MongoDB and/or external Vault with TLS enabled, this command will not affect the external Database or Vault's certificates.

Configuring Timezone

The following section outlines steps to configure the timezone in Anyware Manager.

1. Run the following commands on your workstation where you have Anyware Manager installed.

```
$ sudo timedatectl set-ntp on
```

```
$ timedatectl status
```

After you execute the command above, the command line displays the following message:

```
Local time: Wed 2023-01-11 16:39:43 KST
Universal time: Wed 2023-01-11 07:39:43 UTC
RTC time: Wed 2023-01-11 07:39:43
Time zone: Asia/Seoul (KST, +0900)
System clock synchronized:
```

1. If you wish to manually configure the desired timezone, run the following command:

```
$ sudo timedatectl set-timezone Asia/Seoul
```

Run the following command:

```
$ timedatectl status
```

After you execute the command above, the command line displays the following message:

```
Local time: Wed 2023-01-11 13:06:16 IST
Universal time: Wed 2023-01-11 07:36:16 UTC
RTC time: Wed 2023-01-11 07:36:16
Time zone: Asia/Kolkata (IST, +0530)
System clock synchronized:
```

1. After `System clock synchronized:`, say `yes` and press enter.

The command line displays:

```
NTP service: active  
RTC in local TZ: no
```

Network Time Protocol

Ensure that Network Time Protocol (NTP) is set as 'active' so that the system time doesn't change to UTC by default.

The desired timezone is now configured.

Multi-Admin Support

Multi-Admin Support

Once Anyware Manager is installed, a local **adminUser** user is created to manage Anyware Manager. Optionally, Active Directory or SAML integration can be configured to support additional admin users. If you don't configure either of these integrations, **adminUser** will be the only admin user.

ACTIVE DIRECTORY INTEGRATION

The Active Directory used to enable multi-admin in Anyware Manager does not need to be the same Active Directory that was used by the Connector to manage the users for the remote workstation.

The Active Directory Domain Controller machine must be accessible from the target machine that Anyware Manager is installed on over the LDAPS port (TCP 636). Typically, this is only the case if both machines are on the same LAN.

To enable multiple users to manage Anyware Manager, an Active Directory LDAPS configuration must be added in the Active Directory as outlined [here](#).

Anyware Manager Integration

The following steps are applicable for configuring an Active Directory with Anyware Manager only. They are not applicable to integrating with Anyware Manager as a Service.

Active Directory Configuration Permissions

Only the **adminUser** has the permissions to configure the Active Directory with Anyware Manager from the Anyware Manager Admin Console.

DNS and Name Resolution

You must ensure that you can resolve your AD domain and controller. For information on how to install and edit `resolve.conf`, and configure DNS name resolution, see [Configuring DNS Name Resolution](#).

The following steps outline how to configure Active Directory integration in the Anyware Manager Admin Console:

1. Go to the Anyware Manager Admin Console and log-in using your Anyware Manager admin credentials.
2. Click on **adminUser** from the user account tab and then click on **Multi-Admin Settings**.
3. Click on the **Active Directory Configuration** tab.
4. Enter the Active Directory configuration information:
 - Domain Controller URL: This is the URL where your domain controller is hosted, for example `ldaps://dc.example.com`. You can also use the Fully qualified domain name (FQDN) of the Domain Controller if you do not know the LDAP address.
 - Admin Connection DN: This is the distinguished name (DN) of a user within your AD that is able to search for users. Microsoft AD supports using UPN format for logging in. For example `cn=manager_admin,cn=Users,dc=example,dc=com` or manager_admin@example.com.
 - Admin Password: This is the password for the admin user defined by "Admin connection DN".
 - Manager group DN: This is the DN of a group in your AD. Only users that belong to this group will be able to authenticate to Anyware Manager. For example, `cn=Manager Admins,cn=Users,dc=example,dc=com`.
 - Search Base DN: This is the DN of the container in your AD where we will search for user's to authenticate. For example, `cn=Users,dc=example,dc=com`
5. Click **SAVE** to save the configuration.

User's from the Active Directory belonging to the Manager group will now be able to navigate to the Anyware Manager Admin Console login page and authenticate using their Active Directory credentials.

SAML INTEGRATION

If the Active Directory Domain Controller cannot be accessed, you can alternatively enable Active Directory users to login by enabling the Admin Console's SAML integration.

The following steps outline how to enable SAML integration and configuration of IDP settings, admins and groups access and general configuration information:

1. Go to the Admin Console.
2. Log-in using your Anyware Manager admin credentials.

3. After logging into the Admin Console click on **adminUser** from the user account tab and then click on **Multi Admin settings** to open the preferences page.

4. Click on the **SAML** tab.

5. Enter the SAML configuration information:

- The first section contains auto-generated information about the login URLs and IDP:
 - **Anyware Manager login page:** A link to the page for multi-administrator login to the Admin Console
 - **Direct login via identity provider:** An endpoint to which multi-admin sign-in requests can be sent
 - **Assertion Consumer Service URL:** The callback URL provided to the IDP to which user information is sent once the IDP has authorized the user
 - **Audience URL:** The entity ID that the IDP can use to identify the Admin Console
- The second section contains IDP settings that can be updated to manage the SAML configuration within the Anyware Manager:
 - **Identity Provider Login URL:** The IDP endpoint to which SAML authentication requests are sent
 - **Identity Provider Certificate:** The public certificate of the IDP used to verify the signature of the IDP. You can also upload a .xml file that contains your IDP information.
- The third section enables you to add new admins as well as displaying all existing admins that are allowed to login via an IDP. To enable the access for a single user, visit the **Allowed admins** tab, enter their e-mail, and click the **Add Admin** button.
- The fourth section enables you to add new groups as well as displaying all existing groups that are allowed to login via an IDP. To enable the access for a group of users, visit the **Allowed groups** tab, enter the claim type and group claim and click **Add Group**. The claim type informs Anyware Manager how the group is returned in the SAML assertion by your IDP. The group claim matches against the group either in the Group Name claim or in the Group ID claim returned in the SAML assertion for a user based on the claim type defined for the group.

A user's access via SAML can be enabled or disabled on either the **Allowed admins** or **Allowed groups** tabs.

Configuring the Active Directory for Anyware Manager

Anyware Manager uses Lightweight Directory Access Protocol (LDAP) or Secure Lightweight Directory Access Protocol (LDAPS) with Active Directory servers for user authentication. LDAPS is recommended to give you a more secure environment, through the use of an Active Directory Certificate, which should be available before activating the Active Directory configuration.

The following section details how to configure and add an existing Active Directory with Anyware Manager. You must have an existing Active Directory to use with Anyware Manager.

TEST LDAPS

The first step is to test LDAPS. For information on adding a self-signed certificate to enable LDAPS, see the following [KB article](#).

The following command outlines how to test LDAPS through PowerShell as an Admin. Enter the name of your domain controller in place of `dc1.example.com`:

```
openssl s_client -connect "dc1.example.com":636
```

If you see a certificate successfully returned, then LDAPS for the Active Directory is configured and functioning.

CONFIGURE ACTIVE DIRECTORY FOR ANYWARE MANAGER

The following steps outline how to configure the Active Directory for Anyware Manager:

1. Open the system Control Panel and select **Administrative Tools**.
2. Click **Active Directory Users and Computers** from the list of options. If you don't have an Active Directory installed, then this option will not appear.
3. Create the following groups and users within the *Users* folder:

New Group: **TESTGROUP** New User: **testUser**

The group and user names used above are just examples and can be replaced with any names you choose.

4. Once you have created this new group and user you need to access the Anyware Manager Admin Console and configure the Active Directory. For information on how to do this, see [Active Directory Integration](#).

If you are using the Anyware Manager as a simple broker without power management, the Active Directory user you select will need to have read permission to query the Active Directory. A simple Domain Users group will suffice. If you are using the Anyware Manager with power management features enabled, please see the following section of the Anyware Manager Administrator's guide, [here](#).

AWS Configuration

The following page outlines how to enable AWS features through the AWS management console on Anyware Manager. The first step is to create a policy that can be attached to a service account. This service account will allow Anyware Manager to manage resources within the provided AWS account.

ROLES AND PERMISSIONS FOR AWS

Prior to creating and assigning a permissions policy, you need to ensure that it contains the following permissions:

- **Service:** EC2
- **Actions:**
 - List: DescribeInstances
 - Write: RebootInstances StartInstances StopInstances TerminateInstances

There are additional permissions needed to verify that the policy has all the required permissions before being added to a deployment:

- **Service:** IAM
- **Actions:**
 - List: ListAttachedUserPolicies ListUserPolicies
 - Read: GetUser GetUserPolicy GetPolicy GetPolicyVersion SimulatePrincipalPolicy

If the user tries to add an AWS policy that doesn't have these permissions, Anyware Manager will still add the policy but will not validate that it has the required permissions.

Please note the permissions required for AWS configuration with Anyware Manager as a Service are different to the permissions required for Anyware Manager. See [AWS Permissions Policies for Anyware Manager as a Service](#) for information on these permissions. Currently, the permissions required for Azure and GCP configuration are the same between Anyware Manager and Anyware Manager as a Service.

CREATE A ANYWARE MANAGER POLICY IN AWS

The following steps outline how to create the required AWS policy that you can attach to a AWS User to manage AWS resources:

1. Go to the IAM Management page in the AWS management console.
2. From the sidebar, click **Policies**.
3. Click **Create policy**.
4. For **Service** click **EC2** from the list of services.
5. Under **Access level** expand the **List** section and select **DescribeInstances**.
6. Under **Access level** expand the **Write** section and select the following permissions:
 - **RebootInstances**
 - **StartInstances**
 - **StopInstances**
 - **TerminateInstances**
7. For **Service** click **IAM** from the list of services.
8. Under **Access level** expand the **Read** section and select the following permissions:
 - **GetUser**
 - **SimulatePrincipalPolicy**
9. For **Resources** click **All resources**.
10. Leave **Request conditions** blank and click **Review policy**.
11. Give the newly created policy a name and click **Create policy**.

CREATE ANYWARE MANAGER SERVICE ACCOUNT FOR AWS

This service account will have the ability to perform required actions in AWS. This will let the service account manage resources that the user has access to.

The following steps outline how to create the CAM service account:

1. Go to the IAM Management page in the AWS management console.
2. From the sidebar, click **Users**.
3. Click **Add user**.
4. Give the user a name and select **Programmatic access** as the Access type.

5. Click **Next: Permissions**.
6. Click **Attach existing policies directly** and search for the policy you created above that has EC2 permissions and select it. Optionally, you can add a tag to this role.
7. Click **Next:Review**.
8. Click **Create user**
9. Copy the **User name**, **Access key ID** and **Secret access key** credentials and save them to a secure location.

ADD THE AWS SERVICE ACCOUNT TO A ANYWARE MANAGER DEPLOYMENT

The next step requires you to add the AWS service account you have created from the previous steps in the AWS management console to Anyware Manager. This service account will have the CAM policy created in the previous step.

The following steps outline how to add the information to Anyware Manager:

1. Log in to Anyware Manager.
2. Select the Anyware Manager deployment ou want to add the AWS service account to.
3. Click **Edit Deployment**.
4. Click the **Cloud service accounts** tab and open the AWS container.
5. Enter the **User name**, **Access key ID** and **Secret access key** values that you saved previously in the AWS form.
6. Click **Submit**.

Anyware Manager will have be able to manage AWS machines that get added to this deployment.

Reference

Preparing a Secret Storage Application

The following section outlines the steps involved in preparing specific secret storage applications prior to installing Anyware Manager. Once you have Anyware Manager installed, you can configure the secret storage application to work with Anyware Manager.

Preparing Azure Key Vault

The following section outlines how to prepare Azure Key Vault for key and secret encryption and storage with Anyware Manager.

Before configuring Anyware Manager to use the Azure Key Vault you need to complete the following steps:

1. Create an Azure service principal that is able to read, write and delete secrets from/to the Azure Key Vault. For information on how to create this service principal, see [App Objects and Service Principals](#).
2. Create an Azure Key Vault. For information on how to create an Azure Key Vault, see [Quickstart: Create a key vault using the Azure Portal](#).

Once you have completed the pre-requisite steps above, return to the [Installing Anyware Manager - External Database and Secret Storage Configuration](#) and complete the installation of Anyware Manager.

Preparing Hashicorp Vault

The following section outlines how to prepare Vault for key and secret encryption and storage with Anyware Manager.

Deploying Vault with Consul and Integrated Storage (Raft)

For information on setting up a Vault server using Consul as a storage backend, see Hashicorp's official deployment guide see [Vault using Consul](#). This guide demonstrates how to deploy a Vault in a high availability mode.

HashiCorp's recommendations for a production level deployment of Vault can be found here [Production Level Deployment](#).

Hashicorp's official deployment guide for setting up a Vault server using Integrated Storage (Raft) as a storage backend can be found here [Vault with Raft Storage](#).

Reference Instructions for MongoDB and Vault Configuration

For detailed deployment instructions on installing and configuring MongoDB and Vault in a single virtual machine to be used by Anyware Manager, see the following [KB article](#). This KB article outlines in detail how to install and configure an instance of MongoDB and an instance of Vault on the same virtual machine. This KB article should be used in conjunction with the installation steps outlined in this section.

All configuration steps outlined should be used as a reference only. For specific details user's should visit the vendors official documentation and knowledge base.

The following steps outline how to prepare Vault to be used by Anyware Manager. You can skip these steps if you have setup Vault and prepared it by following the KB article linked above. If you have not gone through the KB above and have already installed and configured the Vault server, following the vendors official documentation site, follow the steps below to add specific Vault configurations required for Anyware Manager:

1. Initialize the Vault. For information on initializing the Vault, see [Initializing the Vault](#).
2. Unseal the Vault. For information on sealing and unsealing the Vault, see [Seal/Unseal](#).
3. Enable the secrets path expected by Anyware Manager by running the following command:

```
vault login  
vault secrets enable -version=2 -path=secret/ kv
```

4. Create a Vault policy called "manager-policy":

```
vault policy write manager-policy - << EOF
path "secret/data/*" {
  capabilities = ["create", "update", "read", "delete", "list"]
}
EOF
```

The output for this command should be:

```
Success! Uploaded policy: manager-policy
```

You can validate the policy by running the following command:

```
vault policy read manager-policy
```

5. Create a role to be used by Anyware Manager by running the following command:

```
vault write auth/token/roles/manager-role allowed_policies="manager-policy"
period="768h"
```

This command will create a token role with the manager policy created above. Any token created using this role will be valid for 32 days, if not renewed. If the token is renewed, then its validation period will be reset back to 32 days. This period should be set in accordance with your security guidelines and should be configured to be as low as possible. The output of this command should be:

```
Success! Data written to: auth/token/roles/manager-role
```

6. Create a periodic token to be used by Anyware Manager by running the following command:

```
vault token create -role=manager-role -orphan
```

This command will create a periodic token which are useful when the token in question is intended to be used by a long-running process or application. For more information on creating Vault tokens, see [Vault Tokens](#). The output of this command should be:

```
Key          Value
---          -
token        <your token is here>
token_accessor <your token accessor is here>
token_duration 768h
token_renewable true
token_policies ["manager" "default"]
identity_policies []
policies      ["manager" "default"]
```

Once you have completed the pre-requisite steps above, return to the [Installing Anyware Manager - External Database and Secret Storage Configuration](#)) and complete the installation of Anyware Manager.

Configuring a Secret Storage Application

The following section outlines the steps involved in configuring specific secret storage applications to work with Anyware Manager. You should prepare the secret storage applications prior to installing Anyware Manager.

⚠ Data Migration between Secret Stores Prohibited

Anyware Manager does not support any data migration between secret stores. If Anyware Manager is originally configured with another secret store application, for example Hashicorp Vault, and is then configured to use Azure Key Vault, Anyware Manager will not have access to the data stored in the original Vault. Anyware Manager will not be able to retrieve any stored passwords, so login requests will fail. Teradici recommends using the same secret store throughout the lifetime of a Anyware Manager instance.

Configuring Azure Key Vault

Follow the steps below to configure Anyware Manager to use the Azure Key Vault as its secret storage application. Anyware Manager must be installed before the command can be run:

1. SSH to the target machine where you installed Anyware Manager.
2. Create a config file that contains the following parameters and information:

```
{  
  "vault-type": "azure",  
  "key-vault-url": "<URL of Azure Key Vault>",  
  "azure-client-id": "<client id of Azure service principal>",  
  "azure-client-secret": "<client secret of Azure service principal>",  
  "azure-tenant-id": "<tenant id of Azure service principal>"  
}
```

3. Run the following command to implement the config file:

```
sudo /usr/bin/local/anyware-manager configure --config-file <config file name>
```

Configuring Hashicorp Vault

Follow the steps below to configure Anyware Manager to use Hashicorp Vault as its secret storage application. Anyware Manager must be installed before the command can be run:

1. SSH to the target machine where you installed Anyware Manager.
2. Create a file that contains the following data:

```
{
    "vault-type": "vault",
    "vault-url": "https://<vault_address>",
    "vault-token": "<vault_token>",
    "vault-secret-path": <in this example: secret/data>
}
```

3. Replace the following place holders with your own values:

- vault_address: IP address or domain name of the Vault server.
- vault_token: The access token generated on the Vault server that will be used by Anyware Manager to access the Vault.

4. Run the following command to configure Anyware Manager to use Vault:

```
sudo /usr/local/bin/anyware-manager configure --config-file path-to-your-
config-file
```

After running this command, Anyware Manager will validate the configuration by attempting to query the Vault's health status. If the request is successful, then Anyware Manager will be configured to use this Vault. The configure command should only take a few minutes to complete. To verify that the connection to the Vault is healthy, run the following command:

```
sudo /usr/local/bin/anyware-manager diagnose --health

## It will show the following if Vault is healthy:
[2021-01-25T22:49:02Z] INFO .. Connections:
[2021-01-25T22:49:02Z] INFO .... Vault=Healthy

## It will show the following if Vault is unhealthy:
[2021-01-26T01:47:10Z] INFO .. Connections:
[2021-01-26T01:47:10Z] ERROR .... Vault=Vault service is unreachable
[2021-01-26T01:47:10Z] ERROR .. Overall Health=Anyware Manager is in
Unhealthy state because Vault is unhealthy
```

Connecting to a Vault server with Self-Signed TLS Certificates

⚠ Tested on CentOS Only

The following steps have been tested on CentOS. These steps may not work, or work differently, on different systems.

The following steps outline how to connect to a Vault server that uses self-signed TLS certificates:

1. Create a file called *vault-config.json* that contains the following:

```
{
  "vault-type": "vault",
  "vault-url": "https://<vault_address>",
  "vault-token": "<vault_token>",
  "vault-ca-cert-file": "<vault_ca_cert_file>",
  "vault-skip-verify-cert": false,
  "vault-secret-path": "secret/data"
}
```

2. Replace the following place holders with your own values:

- *vault_address* (string): IP address or domain name of the Vault server.
- *vault_token* (string): The access token generated on the Vault server that will be used by Anyware Manager to access the Vault.
- *vault_ca_cert_file* (string): The path to the file containing the CA certificate for your self-signed certificate.

3. Run the following command to update Anyware Manager to use Vault:

```
sudo /usr/local/bin/anyware-manager configure --config-file path-to-your-config-file
```

4. If you want to skip certificate verification, include `"vault-skip-verify-cert": true` in your configuration file. Please note that this is not secure and is not recommended for production use cases:

```
{
  "vault-type": "vault",
  "vault-url": "https://<vault_address>",
  "vault-token": "<vault_token>",
  "vault-ca-cert-file": "<vault_ca_cert_file>",
  "vault-skip-verify-cert": true,
  "vault-secret-path": "secret/data"
}
```

Vault Token Auto-Renewal

Anyware Manager does not renew the Vault token by default. You can manually set-up auto-renewal by configuring the `vault-config.json` file. For more information on renewing Vault tokens, see [Vault Token Renewal](#).

Anyware Manager can automatically renew the Vault token. You need to enable the setting in the `vault-config.json` file, and set the interval you wish the token to renew at. To enable this feature, add the Vault token auto-renew settings as follows:

1. Edit the `vault-config.json` file with the following settings:

```
{
  "vault-type": "vault",
  "vault-url": "https://<vault_address>",
  "vault-token": "<vault_token>",
  "vault-secret-path": <in this example: secret/data>
  "vault-enable-token-renew": true,
  "vault-token-renew-interval": "<crontab expression: eg @hourly,
  @daily, @weekly, @monthly>"
}
```

2. Set the auto-renew token setting appropriately. The `vault-token-renew-interval` is a cron tab string. It can either be in a descriptor format as outlined in the above example, or you can set it to your own custom cron tab expression. The cron tab expression needs to be in the following format:

```
"<minute> <hour> <day-of-month> <month> <day-of-week>"
```

Vault Token Renewal Interval

To ensure that the Vault token is kept alive, the renewal needs to be able to occur multiple times before the token expires. If the token expires in a week, then you need to renew at least twice a week, if it expires every day, it needs to be renewed every few hours.

Vault Data Migration

Anyware Manager does not do any data migration between different Vault configurations. If Anyware Manager is updated to use a new Vault configuration, it will no longer be able to access the data from the previous configuration. If the admin user's password had been updated using a prior Vault configuration, you will no longer be able to login. To fix this, do one of the following:

- If you have access to the old Vault, migrate the data from the old Vault to the new Vault.
- Find the key that Anyware Manager is using to look for the admin password in the Vault and then manually store the password in the Vault at that location. To find the key, stream the logs for the secretmgmt service by running the following command:

```
/usr/local/bin/kubectl logs -l app=secretmgmt -f
```

Log in to Anyware Manager using the adminUser account and look for the log that includes the route `/internal/secrets/admin-XXX`. The password is expected to be at `<secret path>/admin-XXX` in the Vault, where *secret path* is the path defined by "vault-secret-path" in your Anyware Manager config-file.

- Update to use a new MongoDB, or drop the `standaloneAdmins` collection in your MongoDB.
WARNING: this will cause you to lose all of your Anyware Manager data.

Backing up and Restoring Anyware Manager Data

The following sections outline the steps to backup the data stored using in-cluster data storage applications, and used by Anyware Manager. It also outlines how to restore this data from the created archive, as well as how to then migrate this data to another virtual machine.

Backing up Anyware Manager Data

The following section outlines how to back up the data stored and used by Anyware Manager, by creating an encrypted archive of the data.

Backup Command for In-Cluster Storage Only

The backup command can only be run if Anyware Manager is using in-cluster data storage for both Vault and MongoDB. This command will not work if Anyware Manager is using an external Vault or MongoDB.

To backup the data run the following command in an SSH terminal:

```
sudo /usr/local/bin/anyware-manager backup
```

This will create an encrypted archive of the Vault and MongoDB data used by Anyware Manager. If successful, the backup archive file and decryption key file locations will be displayed in the terminal.

The backup archive file will be stored in the `/opt/teradici/casm/backups/` directory. The decryption key will be stored in the `/opt/teradici/casm/.private/backup.key`. Anyware Manager will only create a new decryption key if one does not already exist. If there is an existing decryption key then it will continue to use it.

Once the file and key has been created, you will need to change the ownership of the file to the SSH user using the `chown` command. You can move the files to a specific directory, change the owner, and the correct permissions will be assigned. The following script is an example of this command:

```
ssh user1@machine1
sudo mv /opt/teradici/casm/backups/<archive_name> ~/backup.tar
sudo chown user1:user1 ~/backup.tar
exit

ssh user2@machine2
scp user1@machine1:~/backup.tar .
```

You will also need to copy the decryption key and change its ownership. The following script is an example of this command:

```
ssh user1@machine1
sudo cp /opt/teradici/casm/.private/backup.key ~/
sudo chown user1:user1 ~/backup.key
exit

ssh user@machine2
scp user1@machine1:~/backup.key .
```

Restoring Anyware Manager Data

Once you have backed up the data to the encrypted archive, you need to restore this data. If the restore command fails, Anyware Manager will attempt to try and restore using a backup archive that is automatically created right after the restore command has been run. If this is successful, Anyware Manager will have the same data as before the restore was attempted. To skip the rollback feature, add `--skip-rollback` to the arguments of the restore function.

Restore Command for In-Cluster Storage Only

The restore command can only be run if Anyware Manager is using in-cluster data storage for both Vault and MongoDB. This command will not work if Anyware Manager is using an external Vault or MongoDB.

To restore the data run the following command in an SSH terminal:

```
sudo /usr/local/bin/cas-manager restore --archive <path to archive file> --  
key <path to key file>
```

If you do not specify a key, Anyware Manager will attempt to restore using the key found at `/opt/teradici/casm/.private/backup.key`.

Moving Anyware Manager Data

It is possible to backup data on one Anyware Manager virtual machine, and then restore the resulting archive on a separate Anyware Manager virtual machine. Once you have backed up the data successfully on the first Anyware Manager virtual machine, you can move the encrypted archive to another virtual machine.

You must ensure you have a machine that has SSH access to the virtual machines that host each of the Anyware Manager instances. You must first copy the encrypted archive and decryption key to this machine, then you can move the data from this intermediary machine to the new Anyware Manager virtual machine.

The following steps outline how to move Anyware Manager data:

1. Run the following command to copy the encrypted archive to a machine that has SSH access to the Anyware Manager instance:

```
scp <username>@<manager1_URL>:/opt/teradici/casm/backups/<archive_name>  
<path on machine that contains manager backups>
```

2. Run the following command to copy the decryption key to the same machine that has SSH access to the Anyware Manager instance:

```
scp <username>@<manager1_URL>:/opt/teradici/casm/.private/backup.key <path  
on machine that contains manager backup keys>
```

3. Run the following command to move the encrypted archive file from the machine to the host of the new Anyware Manager virtual machine:

```
scp <path on machine that contains manager backups>/<archive_name>  
<username>@<manager2_URL>:<path on manager2 host that contains backups>
```

4. Run the following command to move the decryption key file from the machine to the host of the new Anyware Manager virtual machine:

```
scp <path on machine that contains manager backup keys>/backup.key  
<username>@<manager2_URL>:<path on manager2 host that contains backup keys>
```

Migrating from a Default to External Configuration

The following section outlines the steps involved in migrating the data stored in the internal data storage applications as part of a default configuration of Anyware Manager, to MongoDB and Vault instances in the external configuration mode.

Prerequisites for Migrating Anyware Manager Data

⚠ Migration Commands are for Internal Storage Only

The migration commands can only be run if Anyware Manager is using internal data storage for Vault or MongoDB as part of the default configuration. The Vault migration commands will not work if Anyware Manager is already using an external Vault. The MongoDB commands commands will not work if Anyware Manager is already using an external MongoDB.

1. Create the configuration files for the target MongoDB and Vault you are migrating Anyware Manager data to. To create blank configuration files run the following command in an SSH terminal:

```
/usr/local/bin/anyware-manager generate --vault --mongo
```

This will create `mongo-template.json` and `vault-template.json` files which will be created in the `config-templates/` directory within the current directory. The commands output will contain the full path to the files for reference.

2. Input the required parameters for the configuration file by following the instructions [here](#).
3. In order for our migration scripts to be able to read from these files, please install the `jq` utility by running the following command in an SSH terminal:

```
sudo dnf install -y jq
```

Migrating Internal MongoDB Data

The following steps outline how to migrate the internal MongoDB data to the external MongoDB instance as part of an external configuration of Anyware Manager.

⚠ Migration Commands are for Internal Storage Only

The migration commands can only be run if Anyware Manager is using internal data storage for MongoDB. This command will not work if Anyware Manager is using an external MongoDB instance.

Once you have configured the `config-templates/mongo-template.json`, you can run the following commands to migrate the data from the internal storage to the external MongoDB instance.

1. Run the following command in an SSH terminal to set the configuration for where to migrate the data to:

```
# Set path to Mongo Configuration file
export PATH_TO_MONGO_CONFIG='config-templates/mongo-template.json'
```

2. Run the migration script. Ensure that the `DEST_MONGO_DB` is set correctly. It should match the database specified by the MongoDB connection string in the configuration file.

```

# Run Commands to migrate MongoDB data from internal MongoDB to external
MongoDB
/usr/local/bin/kubectl exec -it deployments/mongo -- bash -c "
#!/bin/sh
set -e

# If destination DB is different from default (managerdb), set it
accordingly.
export DEST_MONGO_DB='managerdb';

# Get connection string from mongo configuration file.
export DEST_MONGO_CONNECTION_STRING=$(jq '.db-connection-string' $
{PATH_TO_MONGO_CONFIG});

# Check if TLS is enabled for external MongoDB
if [[ $(jq '.db-enable-tls' ${PATH_TO_MONGO_CONFIG}) == 'true' ]]; then
    export MONGO_TLS='--ssl --tlsInsecure'
fi

# Get internal MongoDB's credentials
export MONGO_ADMIN=$(/usr/local/bin/kubectl get secrets/mongo-secret --
template={{.data.username}} | base64 -d);
export MONGO_DB=$(/usr/local/bin/kubectl get secrets/mongo-secret --
template={{.data.dbname}} | base64 -d);
export MONGO_PWD=$(/usr/local/bin/kubectl get secrets/mongo-secret --
template={{.data.password}} | base64 -d);

$(cat << 'EOF'
# Check if TLS is enabled for internal MongoDB. This file is volume mounted
in K8S manifest when TLS is required for mongo.
if [[ -f /certs/tls_combined.crt ]]; then
    export INTERNAL_MONGO_TLS='--ssl --tlsInsecure'
fi
rm -rf /export/
mkdir -p /export/

# Dump data from internal MongoDB
mongodump ${INTERNAL_MONGO_TLS} -u $MONGO_ADMIN -p $MONGO_PWD --db
$MONGO_DB --gzip --archive=/export/mongo.archive
# Restore dumped data to external MongoDB instance
mongorestore ${MONGO_TLS} --uri="${DEST_MONGO_CONNECTION_STRING}" --drop --
gzip --nsInclude=$MONGO_DB.* --nsFrom=$MONGO_DB.* --nsTo=$DEST_MONGO_DB.*
--archive=/export/mongo.archive

# Clean up
rm -rf /export/

```

```
EOF  
)"
```

Once this command is complete, the last line logged by `mongorestore` will display a message similar to the following:

```
6 document(s) restored successfully. 0 document(s) failed to restore.
```

3. Run the following command to apply the external MongoDB configuration to complete the migration:

```
# Point Anyware Manager instance to External MongoDB  
/usr/local/bin/anyware-manager configure --config-file $  
{PATH_TO_MONGO_CONFIG}
```

After running this command, there may be some momentary down time as the database is switched over. Once the command is complete, Anyware Manager should be functional. If for whatever reason you need to re-run the migration commands, you need to run the following command to start the internal MongoDB:

```
/usr/local/bin/kubectl scale deployments/mongo --replicas=1
```

Common issue are that the `DEST_MONGO_DB` environment variable set in the script and the database specified by the external MongoDB connection string in the configuration file do not match, or there are permissions issues with the credentials in the connection string. Applying the MongoDB configuration again will disable to the internal MongoDB.

Migrating Internal Vault Data

The following steps outline how to migrate the internal Vault data to the external Vault instance as part of an external configuration of Anyware Manager.

Migration Command is for Internal Storage Only

The migration commands can only be run if Anyware Manager is using internal data storage for Vault. This command will not work if Anyware Manager is using an external Vault instance.

Once you have configured the `config-templates/vault-template.json`, you can run the following commands to migrate the data from the internal storage to the external Vault instance.

1. Run the following command in an SSH terminal to set the configuration for where to migrate the data to:

```
# Set path to Vault Configuration file
export PATH_TO_VAULT_CONFIG='config-templates/vault-template.json'
```

2. Create a backup of the internal Vault's token:

```
# Create backup of internal vault's token in case something fails
/usr/local/bin/kubectl create secret generic clustervaulttoken --from-
literal=token="$(/usr/local/bin/kubectl get secret vault-secret --
template={{.data.roottoken}} | base64 -d)" --from-literal=address="$(/usr/
local/bin/kubectl get secrets app --template={{.data.VAULT_ADDRESS}} |
base64 -d) "
```

3. Run the migration script:

```

# Run Commands to migrate Vault data from internal Vault to external Vault
/usr/local/bin/kubectl exec -it deployments/vault -- sh -c "
#!/bin/sh
set -e

# Get target Vault settings from configuration file.
export DEST_VAULT=$(jq '"vault-url"' ${PATH_TO_VAULT_CONFIG});
export DEST_VAULT_TOKEN=$(jq '"vault-token"' ${PATH_TO_VAULT_CONFIG});
export DEST_SECRET_PATH=$(jq '"vault-secret-path"' $
{PATH_TO_VAULT_CONFIG});

# Set existing vault settings
export VAULT_ADDR=$(/usr/local/bin/kubectl get secret clustervaulttoken --
template={{.data.address}} | base64 -d);
export VAULT_TOKEN=$(/usr/local/bin/kubectl get secret clustervaulttoken --
template={{.data.token}} | base64 -d);
export VAULT_SECRET_PATH='secret/';
export VAULT_SKIP_VERIFY='true';

# Dump secrets in json format
$(cat << 'EOF'
rm -rf /export/
mkdir -p /export/
for key in $( vault kv list ${VAULT_SECRET_PATH} | tail +3 )
do
    dest=/export/$key.json
    # Don't copy sub-folders
    if [[ $(echo $key | grep -E '/\s*$') ]]
    then
        continue;
    fi
    mkdir -p /export/${key%/*}
    echo "\"get ${VAULT_SECRET_PATH}$key\"
    vault kv get -format=json -field=data ${VAULT_SECRET_PATH}$key >
$dest;
done

# Copy secrets to destination vault
export VAULT_ADDR=${DEST_VAULT}
export VAULT_TOKEN=${DEST_VAULT_TOKEN}
export DEST_SECRET_PATH=$(echo ${DEST_SECRET_PATH} | sed -e 's|\\(.*\)|data|
|g')
for secret_file in $( ls /export/*.json ); do
    key_file_name=$(basename -- \"$secret_file\")
    key_name=${key_file_name%.*}
    echo "\"put ${DEST_SECRET_PATH}$key_name\"
    vault kv put ${DEST_SECRET_PATH}$key_name @$secret_file;
done

```

```
# Clean up
rm -rf /export/
EOF
)"
```

On successful completion, the output will display a message similar to the following:

```
"get secret/60f9f0455234e00881fd00a2"
"get secret/admin-60f9f0365234e066b4fd00a1"
"get secret/secret-management-service-health"
"put secret/60f9f0455234e00881fd00a2"
Key          Value
---          -
created_time 2021-07-22T22:27:59.961440121Z
deletion_time n/a
destroyed    false
version      1
"put secret/admin-60f9f0365234e066b4fd00a1"
Key          Value
---          -
created_time 2021-07-22T22:28:00.088969023Z
deletion_time n/a
destroyed    false
version      1
"put secret/secret-management-service-health"
Key          Value
---          -
created_time 2021-07-22T22:28:00.207620136Z
deletion_time n/a
destroyed    false
version      1
```

4. Run the following command to apply the external Vault configuration to complete the migration:

```
# Point Anyware Manager instance to External Vault
/usr/local/bin/anyware-manager configure --config-file $
{PATH_TO_VAULT_CONFIG}
```

After running this command, there may be some momentary down time as the vault is switched over. Once the command is complete, Anyware Manager should be functional. If for whatever reason you need to re-run the migration commands, run the following command to start the internal Vault:

```
/usr/local/bin/kubectl scale deployments/vault --replicas=1
/usr/local/bin/kubectl patch cronjobs vaultunseal -p '{"spec" :
{"suspend" : false }}'
sleep 60
```

A common issue is that the destination secret path is incorrect or the Vault has been sealed. If there is a problem please check the configuration and try again.

5. If everything is okay, delete the backup of the internal Vault's token by running the following command:

```
/usr/local/bin/kubectl delete secret clustervaulttoken
```

Once this is deleted you will no longer be able to access data from the internal Vault.

Proxy Configuration for Anyware Manager

ENABLE PROXY CONFIGURATING FOR INSTALLATION

If HTTP/HTTPS proxy is used, then `HTTP_PROXY`, `HTTPS_PROXY` and `NO_PROXY` must be set. For `NO_PROXY`, specific IP addresses or domain names of service that are internal must be added. IP address ranges like "10.0.0.0/8" does not work; exact IP addresses or domain names must be used for `NO_PROXY` for the traffic to be routed through the proxy to work properly. The outlined variables need to be set in the `/etc/environment` file.

The following steps outline how to modify this file to add these variables:

1. Run the following command to edit the `/etc/environment/` file in vi. You could also use vim or nano:

```
sudo vi /etc/environment
```

2. Update the file to include the following environment variables.

```
HTTPS_PROXY="http://hostname_of_proxy:port"
HTTP_PROXY="http://hostname_of_proxy:port"
NO_PROXY=[list of all host names that should not go through the proxy, such
as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
ALL_PROXY="http://hostname_of_proxy:port"
https_proxy="http://hostname_of_proxy:port"
http_proxy="http://hostname_of_proxy:port"
no_proxy="[list of all host names that should not go through the proxy,
such as: localhost, 127.0.0.1, 0.0.0.0, ip_address_of_mongo]
all_proxy="http://hostname_of_proxy:port"
```

3. Save the file. Once you install Anyware Manager you can configure it to use the proxy configuration. From this new terminal, proceed with the installation steps. The proxy configuration is implemented when Anyware Manager is installed.

DISABLE PROXY CONFIGURATION

Once all installations and configurations are done, If Anyware Manager run into issues related to proxy, you can disable proxy on the Anyware Manager server to confirm if that's the cause. To disable proxy:

1. Check the proxy settings saved in the cluster:

```
sudo /usr/local/bin/kubectl edit secret proxysettings -o yaml
```

2. Look for strings such as `HTTP_PROXY`, `HTTPS_PROXY`, `NO_PROXY`.
3. Press the letter "i" to edit the keys to set them to empty string by doing the following:

```
HTTP_PROXY: ""  
HTTPS_PROXY: ""  
NO_PROXY: ""
```

if you do not see one of those strings change the rest to empty string "".

4. Save the new configuration by pressing "ESC" then ":" then "wq".

Anyware Connector

Overview

Anyware Connector is an access hub installed in the customer environment which facilitates PCoIP Client connections to remote workstations. It operates in conjunction with HP Anyware Manager to provide user authentication and entitlement for remote workstation access, including MFA. It enables secure connectivity between users and the remote workstations by eliminating the need for a dedicated VPN by providing NAT services for external users.

The Connector currently runs on an Ubuntu server, we are adding the support to run on Rocky Linux 8 or RHEL 8 starting from **Connector version 22.04.0**. At HP, we are in a constant endeavour to simplify and unify our OS support strategy. To that effect, Anyware Manager and Connector will only support RHEL / Rocky Linux (8.0 & Above) starting H2 of 2023, and we will be EOLing Ubuntu CAC (actual Date TBD). You will be notified six months before a migration path from Ubuntu to RHEL / Rocky Linux for new Anyware Connectors.

The Connector enables Anyware Manager to broker desktops or workstations located in AWS, Google Cloud, Microsoft Azure and on-premises environments. Based on customers' infrastructure, they may need more than one Connector. The Connector communicates with the Anyware Manager which orchestrates and manages Anyware deployments.

You are required to have a valid registration code for HP Anyware Software to be able to successfully deploy Anyware Manager. This code will be sent to you via email from HP and looks like ABCDEF1234@AB12-C345-D67E-89FG. For more information on Anyware Software, see [Anyware Software](#).

Connector on Ubuntu

Prerequisites

Creating the Connector Server

The following sections outline how to create the Connector servers on Ubuntu that are necessary to run the Connector. It also outlines the environment conditions that must be met for a successful installation.

ANYWARE CONNECTOR ON UBUNTU

Anyware Connector is software that runs within an Ubuntu server and enables secure connectivity between users and the remote workstations. It runs in the customer environment such as on-premises, AWS, and Google Cloud. The Connector communicates with the Anyware Manager which orchestrates and manages Anyware deployments.

Creating the Connector Server

The Connector runs on an Ubuntu server (called the Connector server).

Create a dedicated Ubuntu server with the following specifications:

- Ubuntu Server 18.04.
- At least 4GB RAM.
- 30GB available storage or more.
- 2 vCPUs or more.

Once you have setup a dedicated virtual machine for the Connector, please ensure the following environment conditions are met:

- You must have access to the internet.
- The server must be able to resolve the AD domain.
- You must be able to access the server using SSH.
- You must have superuser (sudo) privileges on the server.

- The networking information of the server (including the IP address) must not change while the Connector is operational.
- The server must have a single network interface and IP address. If the server has multiple network interfaces, the Connector will fail to install.
- If you are deploying Ubuntu on ESXi, you must install open-vm-tools to enable the ESXi host to communicate with the Connector server.
- The Connector runs on the following supported domain controller servers:
 - Windows 2016 Server with secure LDAP (LDAPS) enabled.
 - Windows 2012 R2 Server with secure LDAP (LDAPS) enabled.
 - Windows 2019 Server with secure LDAP (LDAPS) enabled.

For information on the session establishment and session bandwidth limits when working with external connections, see [here](#).

Creating a DNS record

If you want to create a DNS record for the Connector, you need to obtain an SSL certificate with its FQDN and provide it (along with the key) when installing the Connector. This will avoid SSL certificate verification warnings.

Verifying the Connector Server

To verify your Connector server network configuration, SSH into the machine and ping the domain and a remote workstation in the domain. You should get a positive response from both attempts:

```
ping <domain FQDN>
ping <remote workstation FQDN>
```

If any of your attempts to verify these components fails, the DNS settings on the Connector server might be misconfigured. For more information on DNS configuration, see [Configuring Network Settings in Ubuntu 18.04](#).

Enabling Connections over WAN

If the Connector server will be accessed outside the domain, it must be configured for external access (this step is only required if you want to enable remote access to the workstations without requiring a VPN):

- The server must have a public IP address. This can be done via bi-directional NAT mapping.
- The `--external-client-cidr` flag takes priority over the `--internal-client-cidr`. The default for the `--internal-client-cidr` is `10.0.0.0/8,172.16.0.0/12,192.168.0.0/16`. Any source that does not match to a `--internal-client-cidr` will default to an external connection.

For example `--external-client-cidr 0.0.0.0/0` will treat everything as an external connection, to reset to the default behaviour you would need to enter the following command and flag parameters:

```
./cloud-access-connector update --internal-client-cidr 10.0.0.0/8 --internal-client-cidr 172.16.0.0/12 --internal-client-cidr 192.168.0.0/16
```

When setting connections from a firewall or security gateway to be external, the internal CIDR will treat connections under a certain range as internal. For example the following example will treat connections originating from under the `10.11.12.0/24` CIDR except `10.11.12.1` as internal:

```
./cloud-access-connector update --internal-client-cidr 10.11.12.0/24 --external-client-cidr 10.11.12.1/32
```

- Port 443 TCP and 4172 UDP/TCP need to be open. Session set-up is done through port 443 and in-session traffic runs through port 4172. - The `--external-pcoip-ip` flag sets the IPv4 address for the Connector for external connections. If this value is not set, the external IPv4 address will be determined automatically. This is an optional setting that can be used when installing the Connector.

For information on the session establishment and session bandwidth limits when working with external connections, see [here](#).

Reboot the server after NAT changes

If the NAT is configured after the Connector has been installed, reboot the Connector server.

Active Directory Service Accounts

The following sections outline the Active Directory (AD) Service Account permissions required for installing the Connector. It also outlines the steps required to set these permissions.

PERMISSIONS REQUIRED TO INSTALL THE CONNECTOR

There are no mandatory permissions required for the AD Service Account to install the Connector. You can optionally delegate the **Reset user passwords and force password change at next logon** task in the Delegation of Control Wizard panel. For steps on how to delegate the password reset task to the AD Service Account, see [Permissions to Change and Reset Passwords](#).

Delegating this task will enable users to change and reset their passwords while connecting to the remote workstations. If this is not set, the user will receive an error.

Higher AD Service Account Permissions

If the user has a higher level of permissions than the AD Service Account, then you will experience password change errors even if the delegation is configured as outlined above.

Domain Controller certificates

If all DC certificates have expired, the Connector will stop working. An error indicator will display on the Connectors page when a Connector has a DC with expired certificates.

A warning indicator that details the current state of the DC certs will display on the same page when a Connector has a certificate that less than a week away from expiring.

For information on how to create and install a self-signed certificate on a Windows 2016 AD server to test LDAP connections, see [KB 1707](#).

Permissions to Change and Reset Passwords

The following steps outline how to delegate the **Reset user passwords and force password change at next logon** task in the Delegation of Control Wizard:

1. Open the **Active Directory Users and Computers** application.
2. Select the user or group you want to delegate, and click **Delegate Control**.

3. Click **Next**.
4. Click **Add** and enter the username or group name that will be granted reset permission.
5. Click **OK**.
6. Click **Next**.
7. Select **Delegate the following common tasks** and select the **Reset user passwords and force password change at next logon** task.
8. Click **Finish**.

During Installation

When the Connector is installed, you will be prompted for the following information:

- The AD Service Account username.
- The AD Service Account password.

Permissions Required to Provision Remote Workstations

Before provisioning a remote workstation you need to ensure that the AD Service Account is correctly configured. This should be a different AD Service Account to the account used when installing the Connector. The AD Service Account needs to have specific permissions, for information on these permissions and how to configure them, see [Provisioning Remote Workstations](#).

Assigning an SSL Certificate

You can assign an SSL certificate to the Connector during installation. This will prevent certificate verification errors when connecting to the Anyware Manager or Anyware Manager as a Service Interface through your browser. It will also prevent the PCoIP client from reporting an insecure connection when establishing a PCoIP session.

The certificate you provide must be signed and validated by a root certificate that the client trusts. The certificate must be combined or bundled with the intermediate certificates in PEM format and copied, along with the key, to the Connector server prior to installation.

For an example of how to create a self-signed certificate, see [Creating a self-signed certificate on a Windows 2016 Active Directory Server](#). For an example of a method to install a certificate on your Active Directory, see [Installing a certificate on your Active Directory server to enable LDAPS](#).

The DNS needs to be setup so that 'manager.test.com' for example, is registered to the public IP address of the application gateway.

When the Connector is installed, you will be prompted for the following information:

- The full path and filename of the SSL key
- The full path and filename of the SSL certificate

If you do not wish to specify a certificate when installing the Connector, you can bypass this by entering the command line option `--self-signed` (which is recommended strictly for testing purposes). If you decide to use a certificate later, We recommend creating a new Connector and deleting the old one. For information on updating SSL certificates, see [Updating the Anyware Connector](#).

Installing Connector on Ubuntu

The Anyware Connector can be installed on Ubuntu 18.04, Rocky Linux 8 or RHEL 8. The section's below outline how to download and install the Connector on these operating systems.

Upgrading a Connector

It is not possible to upgrade a Connector installed on Ubuntu to a Connector installed on RHEL or Rocky Linux. To replace a Connector installed on Ubuntu, you must install the RHEL/Rocky Linux Anyware Connector on a new virtual machine and configure it exactly the same as the existing Connector on Ubuntu.

Installing the Connector on Ubuntu

The following section outlines how to download and install the Connector on **Ubuntu 18.04**. There are three main steps involved in this process:

- Downloading the Connector installer files.
- Generating a Connector token.
- Installing the Connector.

PREREQUISITE STEPS

For instructions and documentation on the Connector prerequisite steps when installing on Ubuntu, see [Connector System Requirements](#).

It is important to read and address all the prerequisites outlined.

DOWNLOADING THE CONNECTOR

The following section outlines how to download the installer files for the Connector. First, connect to the machine and download the Connector files. The commands below will download the Connector archive, and extract it.

You need to ensure that you have a customer account created on our website to access the download information.

Downloading the Installer from our website

The following steps outline the current process that enables you to download the installer directly from our website as a `tar.gz` file or else run the shell script:

1. SSH into the machine:

```
ssh <username>@<server-ip-address>
```

2. Download the installer from HP:

- Open a web browser and navigate to the [Downloads and Scripts](#) tab on the HP support site.
- Download the installer and upload it to the machine or run the shell script provided to download the installer to the machine.

3. Unpackage the installer:

- Previously the installer was extracted into the `~/v2connector` directory. This location has now changed. Run the following command to extract the installer to `/usr/sbin/`:

```
sudo tar xzvf <PATH TO FILE>/cloud-access-connector_<version>_Linux.tar.gz -C /
```

GENERATING A CONNECTOR TOKEN

You are required to have a Connector token when installing the Connector. You need to create or have created a deployment prior to obtaining a token. For information on how to log into the Admin Console, see [Admin Console Connection](#). The following section outlines how to obtain a Connector token using the Admin Console:

1. Click **Connectors** from the console sidebar.

2. Click the add connector button (+ sign located beside **Connectors** heading) to display the connector creation panel.

3. Enter the following information:

- Select the deployment you want to add the Connector to. If you do not have an existing deployment you need to create one.
- Enter the name of the Connector.

- Follow the step by step instructions outlined below.

SELECT A DEPLOYMENT

Deployment name

Test_Teradici_1

DEFINE THE CONNECTOR

Connector name

Test_Connector_01

The length is 2 to 32 and character: ~!@#\$\$%^&*()|+=~?;:~",.<>{}[]/ is not allowed.

Private cloud install instructions

- 1. Create the Cloud Access Connector server**

Create a dedicated Ubuntu server for GCP, AWS, and Private Cloud with the necessary specifications.
- 2. Verify the Cloud Access Connector server**

You need to SSH into the machine and ping the domain and a remote workstation in the domain to verify.
- 3. Enable external access**

Only required if you want to enable remote access to the workstations without requiring a VPN.
- 4. Download the Cloud Access Connector server**

Follow 2 simple steps to connect to the machine and download the Connector installer.
- 5. Get connector token**
- Copy the token to be used when installing the Cloud Access Connector.

eyJhbGciOiJIUzUxMiIsInR5cCI6IkpXVCJ9.eyJjb25uZWN0b3JOYW1

(token is only valid for 2 hours.)
- 6. Install the Cloud Access Connector**

When the installer completes, the IP address of the Cloud Access Connector will be displayed.

4. Click **GENERATE**.
5. Copy the Connector token by click the copy icon.
6. Click **CLOSE** the exit the panel.

You can now use this Connector token when prompted during installation.

INSTALLING THE CONNECTOR

Once the files are downloaded and the access token is set, you can install the Connector. If you are not already connected, connect to the machine via SSH and navigate to the `/usr/sbin` directory. For information on installing the Connector for Anyware Manager and Anyware Manager as a Service, see:

- [Anyware Manager](#)
- [Anyware Manager as a Service](#)

If you are installing a Connector into a Anyware Manager deployment that has other Connectors already deployed, the configuration of the latest Connector installed will take precedence.

Latest Installer Version

Ensure that you are using the latest installer prior to installing or upgrading the Connector. If you are not using the latest installer, you may see one of the following errors or warnings:

- The installer is out of date. Please obtain the latest version and try again. See [Downloading the Connector](#) for instructions.
- The installer is out of date. Please download the latest version from teradici.bintray.com/cloud-access-connector/cloud-access-connector-0.1.1.tar.gz and try again.
- A newer version is available. Please go to [Downloading the Connector](#) to obtain the latest.

For information on troubleshooting Connector installer issues related to this distribution change, see [Installer Issues](#).

DNS and Name Resolution

You must ensure that you can resolve your AD domain and controller. For information on how to install and edit `resolve.conf`, and configure DNS name resolution, see [Configuring DNS Name Resolution](#).

Installing the Connector for Anyware Manager

Once you have downloaded the Connector installer and have obtained a Connector token, run the following command to install Connector to the Anyware Manager instance you have just installed. The first line of this command maps the Connector token to a variable in the shell:

```
export token=<token from Anyware Manager admin console>
sudo cloud-access-connector install \
-t $token \
--manager-url=https://ip-address-of-cas-manager \
--external-pcoip-ip public.ipv4.clients.connect.to \
--manager-insecure
```

- When you are installing the Connector for Anyware Manager you need to ensure that you enable and specify the `--manager-url` flag. This flag specifies the Anyware Manager URL that the Connector connects to. If it is not specified by default it will point to <https://cas.teradici.com>.
- The `--external-pcoip-ip` flag is highly recommended to use in order to explicitly set the public IP that PCoIP Clients will connect to during PCoIP sessions. This is the public IP that the Connector is listening to on port 4172. The installer will reach out to cas.teradici.com and first try to automatically resolve the external IP; if this fails, or is not able to resolve the correct IP, this flag is required. In the case that the Connector machine doesn't have an internet connection, for example in a dark site environment, or the ingress and egress internet traffic are running through different public IPs, this flag is required.
- The `--manager-insecure` flag is only required when the Connector is connecting to a Anyware Manager that is using self-signed certificates. If Anyware Manager is using trusted TLS certificates signed by a public CA, then users will not need to use the `--manager-insecure` command.
- The `--manager-ca-cert` flag can be used to provide the PEM formatted public certificate for the private CA used to sign the Anyware Manager certificate. This flag is useful if the Connector fails to fetch a certificate from the Anyware Manager.

Ensure that you use the options and flags that best suit your system architecture and requirements. If required values are not provided on the command line, you will be prompted for them. For additional flags and options, see [Installation Flags and Options](#).

Installing the Connector for Anyware Manager as a Service

Install the Connector for Anyware Manager as a Service by running the following command:

```
cd /usr/sbin
sudo ./cloud-access-connector install
```

Ensure that you use the options and flags that best suit your system architecture and requirements. If required values are not provided on the command line, you will be prompted for them. For additional flags and options, see [Installation Flags and Options](#).

Anyware Connector - Troubleshooting

If there is an issue installing the Anyware Connector or an existing Connector is failing, please see the troubleshooting section on [Anyware Connector Connectivity](#). Within this section there are steps to check the following:

- Remote Workstation connections
- Active Directory connections
- Anyware Connector component information

You can also view the following KB article [here](#) which provides a list of troubleshooting steps for common issues related to installing the Connector. For information on installer errors related to a change in the distribution system, see [Installer Issues](#).

INSTALLATION FLAGS AND OPTIONS

The following flags can be used to provide values at the command line. If they are omitted from the command and are required, you will be prompted for them:

Flag	Type	Description
Anyware Manager		
<code>--manager-url</code>	String	Required for Anyware Manager, Specifies the Anyware Manager URL that the Connector connects to. If this is not specified it will point to https://cas.teradici.com by default, which is the URL for Anyware Manager as a Service.
<code>--manager-ca-cert</code>	String	Enables users to supply a CA certificate for Anyware Manager to enable the Connector to connect to a Anyware Manager instance using self-signed certificates.
<code>--manager-insecure</code>	String	Is required when the Connector is connecting to a Anyware Manager instance that is using self-signed certificates. If Anyware Manager is using trusted TLS certificates signed by a public CA, then users will not need to use the this command.
<code>--ldaps-ca-cert</code>	String	Enables users to supply a CA certificate for the connection to Active Directory over LDAPS.
<code>--self-signed</code>	String	Installs the Connector with self-signed certificates. This mode is not secure and is intended for testing. The <code>--insecure</code> flag is still supported.
Connector		
<code>--token (-t)</code>	String	Required. The token generated for Anyware Manager.
<code>--accept-policies</code>	–	Automatically accept the EULA and Privacy Policy .
<code>--force-install</code>	String	Replaces any existing Connector installation.
<code>--debug</code>	String	This flag can be run if you initial install of the Connector fails. It provides a detailed output of the Connector installation. This is useful for self-troubleshooting or to provide to the HP support team when logging a support ticket.
<code>--local-license-server-url</code>	String	Sets the URL for PCoIP License Server to be used for PCoIP Sessions. If this is not provided, ensure that the Cloud License Server is registered on the PCoIP Agent. Example: <code>--local-license-server-url http://10.10.10.10:7070/request</code> . For more information on the PCoIP License Server, see PCoIP License Server .
<code>--add-pool-group</code>	String	Specifies one or more Active Directory groups, by entering the distinguished name (DN), to be assigned to pools for remote workstation management (eg, <code>--add-pool-group 'CN=GroupPool1,CN=Users,DC=sample,DC=com'</code> <code>--add-pool-group</code>

Flag	Type	Description
		'CN=GroupPool2,CN=Users,DC=sample,DC=com'). By providing all the existing pools groups in the Connector settings would get replaced by the user specified ones. When running this command you need to run it with adconfig . Example: <code>sudo ./cloud-access-connector adconfig --add-pool-group</code> .
<code>--setup-docker-image</code>	String	Specifies the docker image to be used from the setup container. This is intended to be used for debugging purposes and is not recommended to be used without guidance from HP support. Usage without guidance could result in failed installations.
<code>--docker-registry</code>	String	This is an optional flag that enables users to specify the docker image registry that they want to use when installing or updating a Connector. If an option is not specified, the default registry <code>docker.cloudsmith.io/teradici/cloud-access-connector</code> will be used. This is intended to be used for debugging purposes and is not recommended to be used without guidance from HP support. Usage without guidance from HP could result in failed installations.
<code>--prune-image</code>	Boolean	Removes all unused docker images on this machine to reclaim more disk space. Warning: This command will remove all unused images under Connector and other services, if any. This is equivalent to the <code>docker image prune</code> command. Note: This flag is only supported for 'update' command.
<code>--preferred-name</code>	String	This is an optional flag to determine if the hostname or machine name should be displayed to identify the remote workstations, the default is set to display machine name.
<code>--trusted-customer-license-cert</code>	String	This flag contains the filepath for Trusted customer license certificate.
<code>--trusted-customer-license-key</code>	String	This flag contains the filepath for Trusted customer license key.
<code>--clear-trusted-customer-license</code>	Boolean	Removes the Trusted customer license certificate and key.
<code>--pull-connector-config</code>	Boolean	This flag gets the Connector configuration from the Anyware Manager.
<code>--push-connector-config</code>	Boolean	

Flag	Type	Description
		This flag saves the Connector configuration into the Anyware Manager.
Firewall		
<code>--https-proxy</code>	String	Specify the URL for a HTTPS proxy (overrides related proxy settings in environment variables). Warning: HTTP Proxy support is deprecating, and it will be removed in a future release.
<code>--connector-network-cidr</code>	String	This is the CIDR to use for the Connector's docker network. The default docker network subnet is 10.101.0.0/16.
<code>--internal-client-cidr</code>	String	The CIDR for PCoIP Clients that connect to remote workstations directly. It is possible to specify multiple <code>--internal-client-cidr</code> networks.
<code>--external-client-cidr</code>	String	The CIDR for PCoIP Clients that connect to remote workstations through the Security Gateway. If external CIDRs settings are set, internal settings must be explicitly set. It is possible to specify multiple <code>--external-client-cidr</code> networks.
PCoIP Software Client		
<code>--retrieve-agent-state</code>	Boolean	Enables the broker to retrieve the agent state for unmanaged and managed remote workstations. The default value for this flag is false. The available states are <i>In Session, Ready, Starting, Stopping, Stopped</i> and <i>Unknown</i> . The value of this flag can either be true or false.
<code>--show-agent-state</code>	Boolean	Controls if the agent state is displayed as part of the remote workstation name in the PCoIP Client. The default value for this flag is true. Setting the value of this flag to true and the <code>--retrieve-agent-state</code> flag to false will result in no agent state displaying.
<code>--external-pcoip-ip</code>	String	Sets the public IP for PCoIP Client to PCoIP Agent connection. This is the public IP that the Connector is listening to on port 4172. The installer will reach out to cas.teradici.com and first try to automatically resolve the external IP; if this fails, or is not able to resolve the correct IP, this flag is required. In the case that the Connector machine doesn't have an internet connection, for example in a dark site environment, or the ingress and egress internet traffic are running through different public IPs, this

Flag	Type	Description
		flag is required. For more information on external network access, see Enabling External Network Access .
Domain		
<code>--domain</code>	String	The AD domain that remote workstations will join.
<code>--sa-user</code>	String	The Active Directory service account username.
<code>--sa-password</code>	String	The Active Directory service account password.
<code>--domain-controller</code>	String	Specifies one or more domain controllers to use with the Connector.
<code>--users-filter</code>	String	The filter to search for users within Active Directory. Specify multiple filters with multiple options. Default user filter: (&(objectCategory=person)(objectClass=user)).
<code>--computers-filter</code>	String	The filter to search for computers within Active Directory. Specify multiple filters with multiple options. Default computer filter: (&(primaryGroupID=515)(objectCategory=computer)).
<code>--users-dn</code>	StringArray	The base DN to search for users within AD. Specify multiple DNs with multiple options. Newly provided base DN(s) will automatically replace previous base DN(s). This field is looking for user's within the user-defined DN and SGs.
<code>--computers-dn</code>	StringArray	The base DN to search for computers within AD. Specify multiple DNs with multiple options. Newly provided base DN(s) will automatically replace previous base DN(s).
<code>--sync-interval</code>	uint8	The interval (in minutes) for how often to sync AD users and computers with the CASM Service.
MFA		
<code>--enable-mfa</code>	String	Installs with multi-factor authentication enabled.
<code>--radius-server</code>	String	The FQDN or IP address of the RADIUS server to use for MFA. This flag is optional.
<code>--radius-port</code>	String	The RADIUS server port. If not specified, the default port (1812) is used. If <code>--radius-server</code> is specified then this flag is optional.
<code>--radius-secret</code>	String	The shared secret used for configuring RADIUS authentication.

Flag	Type	Description
		If <code>--radius-server</code> is specified then this flag is required.

| **Certificates** | | `--ssl-key` | String | The full path and filename of the SSL key to use.

The `--self-signed` flag overrides this flag. | `--ssl-cert` | String | The full path and filename of the SSL certificate (in PEM format) to use.

The `--self-signed` flag overrides this flag. |

Troubleshooting the Connector

If you encounter issues when attempting to install the Connector, please see the Troubleshooting section for information on how to potentially diagnose the specific issue. You can also view the following KB article [here](#) which provides a list of troubleshooting steps for common issues related to installing the Connector. For information on installer errors related to a change in the distribution system, see [Installer Issues](#).

MULTI-FACTOR AUTHENTICATION

When installing the Connector you can enable multi-factor authentication (MFA) by running the `--enable-mfa` flag. MFA will be disabled by default. If you want MFA to only apply to external connections, you should have separate Connectors. One Connector should be for external connections, where MFA is enabled, and one for internal or direct connections, where MFA is disabled. For steps on how to install the Connector with MFA bypassed for internal connections, see [Installing the Connector for Internal Connections](#).

For external facing Connectors you should apply firewall and network settings, such as placing it in a DMZ for example. For external facing Connectors, ensure that you set `--external-client-cidr` to `0.0.0.0/0` so that everything through this Connector is treated as an external connection. It is not recommended to rely on the IP range to manage authentication levels, and for better security you should use separate Connectors.

Ensure that you use the options and flags that best suit your system architecture and requirements. If required values are not provided on the command line, you will be prompted for them. For additional flags and options, see [Installation Flags and Options](#).

Installing the Connector for Internal Connections

The following steps outline how to install the Connector for internal connections to bypass MFA:

1. Prepare a virtual machine in your private network that meets the [system requirements](#) with the following sub-steps:
 - Skip the step for preparing the system for external access.
 - Skip the step for setting up MFA.
2. Install the Connector with the following sub-steps:
 - Do not set the Public IP using the `--external-pcoip-ip` flag. The Connector will instead return the virtual machines IP address.
 - No MFA flag is required as MFA is disabled by default.
3. Once you have installed the Connector connect to a remote workstation with a [PCoIP Software Client](#) with the following sub-step:
 - In the *Host Address or Code* field enter the private IP of the internal Connector you just installed and log-in.

If you want to use the same url for an external Connector as an internal Connector, for example `connector.domain.com`, you must set-up an internal/private DNS. In this DNS create an entry called `connector.domain.com` and map it to the private IP of the internal Connector. User's will then be able to connect to this entry by entering `connector.domain.com` in the *Host Address or Code* field in the PCoIP Client. The internal connection will connect to the internal Connector, and the external connection will connect to the external Connector.

CONNECTING TO A REMOTE WORKSTATION WITH A PCOIP CLIENT

After successfully installing a Connector, you can initiate a session to connect to a remote workstation with a PCoIP Software Client. We enable customers to use multi-factor authentication for these PCoIP Client sessions. The following steps outline how to connect to a remote workstation using the PCoIP Software Client:

1. Double-click the PCoIP Client desktop icon or program file `PCoIPClient` to launch the application.
2. In the *Host Address or Code* field, enter one of the following:
 - For direct connections, provide the address of the host machine.
 - For managed connections, provide the address of the connection manager.
3. Click **NEXT**.

4. Select your domain and enter the credentials for the remote workstation. If you have enabled MFA then you will be prompted for the 2nd factor passcode. The method of how this passcode is communicated depends on the provider you used. It is usually either a One Time Password or push notification.
5. Click **LOGIN**.
6. If your login is successful you should be able to select the remote workstation and connect to it. Please note that if you have a single remote workstation, that remote workstation is automatically selected and the connection is initiated immediately. In this case you will not be presented with a remote workstation selection screen.

For more information about the PCoIP Software Client, please see the following PCoIP Software Client guides:

- [PCoIP Software Client for Windows](#)
- [PCoIP Software Client for macOS](#)
- [PCoIP Software Client for Linux](#)

Upgrading the Connector on Ubuntu

The following section outlines how to update the Anyware Connector on Ubuntu.

Updating the Connector

When updating the Connector using "Update" command, it restarts to apply the updated configurations and all the active sessions going through the connector are disconnected. This requires users to log in again and reconnect. Only when use "adconfig" command to update `--add-pool-group` restart is not required.

When updating an installed Connector you must download the latest version of the Connector installer. For information on how to download the Connector installer, see [Connector Installation](#). All parameters persist from installation using pre-defined configurations and do not need to be updated unless new configurations are required. For more information on this please see the [Persistent Parameters](#) section below.

Once you have downloaded the latest installer, run the update command:

```
cd /usr/sbin
sudo cloud-access-connector update
```

Internal IP Address

As part of the update command the Connector will send its internal IP address to Anyware Manager. Previously, this only occurred during installation.

Latest Installer Version

Ensure that you are using the latest installer prior to installing or updating the Connector. See [Installing a Connector](#). Please note that older installs and updates may still be in the legacy directory at `~/v2connector`. If you are not using the latest installer, you may see one of the following errors or warnings:

- The installer is out of date. Please obtain the latest version and try again. See [Downloading the Connector](#) for instructions.
- A newer version is available. Please go to [Downloading the Connector](#) to obtain the latest.

For information on troubleshooting Connector installer issues related to this distribution change, see [Installer Issues](#).

Persistent Parameters

Parameters can persist from installation through an update using the pre-defined configurations. As part of the update command, the Connector will search and read from the existing configuration and use the pre-existing information as part of the update.

If you wish to update any parameters with new information as part of the update, you can add these parameters when you are running the update command, for example, if you wanted to update the domain controller you would run the following command:

```
cd /usr/sbin
sudo cloud-access-connector update --domain-controller mydomain.com
```

If you do not add domain controllers during the update, any domain controllers that have been previously saved in the configuration will be used. If there are no domain controllers saved, the system will do an auto-discovery to find which domain controllers could be used.

Expired User Credentials

Be aware that you have a `--sa-user` or `--sa-password` that are expired and you do not add the new credentials to the update, then the update will fail. Please ensure these credentials are valid when performing an update of the Connector.

Installation Flags and Options

For detailed information on the installation flags and options that you can pass during installation, see the [Installation Flags and Options](#) table in the Connector on Ubuntu installation instructions.

ENABLING MFA WHILE UPDATING

You can enable MFA to the Connector with the `--enable-mfa` flag when performing an update. You need to have the following information:

- RADIUS server IP address or FQDN.
- RADIUS shared secret for configuring RADIUS authentication.

```
sudo ./cloud-access-connector update --enable-mfa
```

If you do not provide the locations of your RADIUS server and RADIUS shared secret, you will be prompted to do so.

REMOVING MFA WHILE UPDATING

You can disable MFA from the Connector with the `--disable-mfa` flag when performing an update.

```
sudo ./cloud-access-connector update --disable-mfa
```

UPDATING SSL CERTIFICATES

Before updating SSL certificates, ensure that you are aware of the requirements for creating and updating certificates, see [Assigning a Certificate to the Connector](#). You can update your Connector's SSL certificate and key by running the following command and specifying your SSL certificate and SSL key information:

```
sudo ./cloud-access-connector update --ssl-cert path/to/cert --ssl-key path/to/key
```

Certificate format

The SSL certificate must be a PEM file. A CRT formatted file will not work with the update command above.

This command will enable you update your SSL certificate information without having to re-install the Connector. This command also enables you to change your self-signed certificate to a signed certificate.

Domain Controller Certificates

If all DC certificates have expired, the Anyware Connector will stop working. An error indicator will display on the **Connectors** page when a Anyware Connector has a DC with expired certificates.

A warning indicator that details the current state of the DC certs will display on the same page when a Anyware Connector has a certificate that less than a week away from expiring.

Reference

Configuring the Broker Response Timeout

The following section outlines how to increase and set the *BROKER_MAX_WAIT_SECONDS* parameter for the Connector.

1. Make a copy of the *docker-compose.yaml* file by running the following command:

```
cp /opt/connector_data/docker-compose.yaml /opt/connector_data/docker-  
compose-new.yaml
```

2. Edit */opt/connector_data/docker-compose.yaml* to add an environmental variable.

- If you have an active Security Gateway, find the *cm* service section and add the following parameter and enter a value in seconds:

```
BROKER_MAX_RESP_WAIT_SECONDS=<required_value>
```

- If you don't have an active Security Gateway, find the *cm* service section and add the following parameter and enter a value in seconds:

```
BROKER_MAX_RESP_WAIT_SECONDS=<required_value>
```

3. Update the Connector by running the following command:

```
cloud-access-connector update --compose-file /opt/connector_data/docker-  
compose-new.yaml
```

Connector on RHEL/Rocky Linux

Prerequisites

Creating the Connector Server

This sections outline how to create the Connector servers on RHEL/Rocky Linux and other system requirements that are required to install and run the Connector.

Minimum Requirements

The following section outlines the minimum requirements for installing the Connector on Rocky Linux and RHEL. You need an operating system with the following specifications:

- Operating System: RHEL/Rocky Linux 8.x.
- Minimum 4GB RAM.
- 4 CPU
- Minimum 30 GB Storage
 - If you are using LVM and `/var` is mounted on a separate volume, that volume must have 30 GB or more. This is to ensure that the installation process succeeds and Anyware Connector can function at an optimum level.

Network Requirements

Once you have setup a dedicated Virtual Machine(VM) for the Connector, please ensure the following environment conditions are met:

- You must have access to the internet for an online installation. For Darksite installation see, [Installing the Connector on RHEL/Rocky Linux- Darksite Installation](#)
- The virtual machine needs the following port configuration:
 - Port 4172 configured for inbound/outbound TCP/UDP traffic
 - Port 443 configured for outbound TCP traffic

- Port 443 configured for inbound TCP traffic if the connector will be accepting connections from PCoIP clients external to the network. For additional port and firewall information, see [Firewall Load Balancing Considerations](#).
- You must have console access to the virtual machine using SSH.
- The server must be able to resolve the AD domain.
- You must have superuser (sudo) privileges on the virtual machine.
- The networking configuration of the server (including the IP address) must not change while the Connector is operational.

Firewall Configuration

Before you configure firewall, please ensure the following conditions are met:

- The Virtual Machine must have port TCP 443 and TCP/UDP 4172 enabled in its firewall rules
- Within virtual network in the VM, the Firewalld is configured properly for Anyware Connector to run within the Virtual Machine.
 - You can confirm it by running the following command:

```
sudo systemctl status firewalld
```

If the firewalld status is 'active', make sure you execute the following commands to configure firewall correctly. If the firewalld status is 'inactive' and your organization does not require firewall on the Anyware Connector VM, then please skip the step below.

Commands to configure firewall:

```
sudo firewall-cmd --permanent --add-port=6443/tcp # virtual network flannel
sudo firewall-cmd --permanent --add-port=4172/tcp # PCoIP SG port
sudo firewall-cmd --permanent --add-port=4172/udp # PCoIP SG port
sudo firewall-cmd --permanent --zone=trusted --add-source=10.42.0.0/16 # This
subnet is for the pods
sudo firewall-cmd --permanent --zone=trusted --add-source=10.43.0.0/16 # This
subnet is for the services
sudo firewall-cmd --reload
```

Disable Swap

Connector is built on K3s, and it's strongly recommended to disable swap on a Linux system to avoid memory issue in a production environment. It is recommended to disable swap on a Linux system to avoid memory issue.

You can do the following to disable swap:

- If this is a new install and you want to disable swap permanently on the Connector server:
 - Edit the `/etc/fstab` file and add '#' in front of any line that contains the word 'swap'.
- If you have an existing Connector and is running into memory issue, run the following command to disable swap immediately. (This is not retained after a system reboot):
 - `sudo swapoff -a`

If Swap is required for any reason, it should be greater or equal to the size of the RAM. There is no guarantee that it works, so it is strongly recommended to disable it.

Enabling Connections over WAN

When the Connector server is accessed outside the domain, it should be configured for external access (this step is only required if you want to enable remote access to the workstations without requiring a VPN):

To enable external PCoIP connections:

- The remote server should have a public IP address. This can be done via bi-directional NAT mapping. During the installation, you should use the `--external-pcoip-ip` flag to set the IPv4 address for the Connector for external connections.
- By default `--enable-security-gateway` is set to true forcing all sessions to go through security gateway to allow external users to connect to their workstations, if your environment consists of internal users, the Security Gateway can be disabled by passing `--enable-security-gateway=false`.

Verifying the Connector Server

To verify your Connector server network configuration, SSH into the machine and ping the domain and a remote workstation in the domain. You should get a successful response from both attempts:

```
ping <domain FQDN>
ping <remote workstation FQDN>
```

DNS and Name Resolution

You must ensure that you can resolve your AD domain and controller. For information on how to install and edit `resolve.conf`, and configure DNS name resolution, see [Configuring DNS Name Resolution](#).

Confirming the CIDR for Connector Cluster

Once the Connector server is verified, you need to confirm the CIDR for the Connector Cluster.

Confirm the CIDR for Connector Cluster

- The default CIDR used for the Connector's k3s network are: 10.42.0.0/16, 10.43.0.0/16,10.43.0.10.
- The CIDR must not be in conflict with customer's enterprise network CIDRs, where the Connector Virtual Machine is accessible.
- If any of the default Connector Cluster's CIDR is in conflict, confirm the desired CIDRs to be used by Connector that are Not in conflict:
 - `--cluster-cidr` : this is to set cluster CIDR, default is 10.42.0.0/16.
 - `--service-cidr`: this is to set service CIDR, default is 10.43.0.0/16.
 - `--cluster-dns`: this is to set cluster dns ip address, default is 10.43.0.10, it has to be part of of the `--service-cidr`.
- Record the new CIDRs if the default is in conflict, they are required for Connector configuration during installation, For example, to change the cluster CIDR to 192.168.10.0 and service to 172.16.0.0. The configure command example: `sudo anyware-connector configure --cluster-cidr 192.168.10.0/24 --service-cidr 172.16.0.0/16 --cluster-dns 172.16.0.10.`

DNS Name Resolution Configuration on RHEL/Rocky Linux

To install and configure Anyware Connector on the RHEL or Rocky Linux machine, its important to have a connection between the machine and the Active Directory Domain Controller.

Check that the DNS Name Resolution works as expected

1. Check the `/etc/resolv.conf` file to ensure that the desired DNS servers and search suffixes are present.

```
cat /etc/resolv.conf
# Generated by NetworkManager
search example-domain.com
nameserver 10.162.0.42
```

2. Test the DNS by pinging the Domain, in this example example-domain.com:

```
ping example-domain.com
```

3. If the response is successful, you should receive a message similar to the example below:

```
PING example-domain.com (10.162.0.42): 56 data bytes
64 bytes from 10.162.0.42: icmp_seq=0 ttl=118 time=16.622 ms
64 bytes from 10.162.0.42: icmp_seq=1 ttl=118 time=50.675 ms
64 bytes from 10.162.0.42: icmp_seq=2 ttl=118 time=27.682 ms
64 bytes from 10.162.0.42: icmp_seq=3 ttl=118 time=19.886 ms
^C
--- example-domain.com ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
```

4. Restart the Virtual Machine(VM) and check if the DNS settings in `/etc/resolv.conf` persist and that you can still ping the domain as shown in steps 2-3 above. If it does not work, please follow the steps in [Configure DNS Settings](#) below.

Applying Host VM's DNS settings to K3S

The host Virtual Machine's DNS settings are copied from `/etc/resolv.conf` and applied to the Anyware Manager and/or Connector whichever is installed when the K3S service starts. Hence, it is important that settings are correct after a restart. You will either need to reboot the VM or restart the K3S service to apply the DNS settings to the Anyware Manager or Connector whichever is installed, if changes are made post installation or configuration.

Configure DNS settings

If the DNS Name resolution work as expected, please skip the steps below.

To ensure DNS settings are configured properly on the machine for Anyware Manager or Connector to operate, please perform the following steps(the sample IP of the Domain Controller is 10.162.0.42 for `example-domain.com`):

1. Disable auto-configuration of DNS settings bto prevent overwriting on reboot. In this example the device name is `eth0`.

```
nmcli device modify eth0 ipv4.ignore-auto-dns yes
```

You also need to disable this on the connection level in some cases. In this example the connection name is `eth0`.

```
nmcli connection modify eth0 ipv4.ignore-auto-dns yes
```

2. Add the DNS1 for the IP address for Active Directory's DNS server (typically the Domain Controller itself) and optionally DNS2 for fallback DNS server and optionally DOMAIN for a DNS suffix (typically the Domain name) in the network configuration scripts.

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-eth0
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=dhcp
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=ens192
UUID=dfe16427-21f1-429c-99cb-a1e9b42be181
DEVICE=ens192
ONBOOT=yes
DNS1=10.162.0.42
DOMAIN=example-domain.com
PEERDNS=no
```

3. Restart the Network Manager.

```
sudo systemctl restart NetworkManager
```

4. Follow steps in the [Check that the DNS Name Resolution works properly](#) section to confirm the DNS name resolution works properly.

Preparing Security Certificates

To ensure the communications between Anyware Connector and external entities are trusted and secured, the following certificates are recommended:

- Certificate for establishing LDAPs connection from Connector to AD , typically it is the DC certificate
- Certificate for the Connector to establish HTTPs connection from PCoIP client to Connector for Login
- Certificate for Anyware Manager to establish HTTPs connection from Connector to Anyware Manager installed locally

These certificates are not required, especially for testing purposes, there is option to bypass some of them, however it is recommended to have them for production use.

DOMAIN CONTROLLER CERTIFICATES

Configuring *ldaps-ca-cert* Flag

Domain Controller Certificate is required for secure and trusted communication to the Active Directory using LDAPs. By default the certificate is signed by a private Certificate Authority(CA). However for the Connector to validate the certificate and communicate securely with the Active Directory the certificate should be signed by a Public Certificate Authority(CA). If verifying Active Directory certificate is required use `--ldaps-ca-cert` to pass Active Directory root certificate, in the case where validating the certificate is not required use `--ldaps-insecure` flag to skip verification.

Anyware Connector runs with the following supported Domain Controller servers:

- Windows 2016 Server with secure LDAP (LDAPS) enabled.
- Windows 2012 R2 Server with secure LDAP (LDAPS) enabled.
- Windows 2019 Server with secure LDAP (LDAPS) enabled.

It is recommended to provide Domain Controller or Domain's root certificate. Alternatively you can provide the public certificate for the leaf certificate for the Domain Controllers instead, leaf certificate is valid for a shorter time such as 1 year than the CA cert, which usually is valid for 5 years. For more information, see [How to create and install a self-signed certificate on a Windows 2016 Active Directory server to enable LDAPS](#).

If you don't have the CA cert, you can get the leaf certificate by running the following command:

```
openssl s_client -connect domain-controller.domain.com:636
```

Here the `domain-controller.domain.com` is the Domain Controller's Fully qualified domain name and 636 is the LDAPs port.

Configuring *ldaps-insecure* Flag

LDAPs with a root Certificate is the recommended way to use Anyware Connector. This way, communication from the Connector to the Active Directory is done using a secure TLS connection. If you do not wish to install the CA cert or want to skip certification verification for testing purposes, you can use `--ldaps-insecure` flag. This flag helps you establish a encrypted connection between the Connector and Active Directory however, that connection is not validated.

Configuring *enable-plaintext-ldap* Flag

For non production environment, LDAP could be used instead of LDAPs to avoid setting up certificates. LDAP is non secure protocol and message between the Connector and Active Directory are sent in plain text.

To enable the LDAP mode, use the following flag:

```
--enable-plaintext-ldap
```

Domain Controller certificates expiry

When all the LDAPs certificates expire, the Connector stops working and displays an error message on the Connectors page. Also, a warning message that details the current state of the certificates is displayed on the same page when a Connector has a certificate that is less than a week away from expiring.

CONNECTOR TLS CERTIFICATE

Connector TLS certificate is required for secure and trusted connection between PCoIP client and Anyware Connector, you can bypass this using `--self-signed` (or `--insecure`) flag which will generate a self-signed certificate and key for the Connector. However, the PCoIP clients gets insecure warning when establishing a connection, which is recommended strictly only for testing purposes. For production use, you should assign a TLS certificate to the Connector during installation. This

prevents insecure connection errors when connecting to Anyware Connector, Anyware manager is not affected by this certificate.

ANYWARE MANAGER CERTIFICATE

Anyware Manager Certificate could be required and obtained using `--manager-ca-cert` flag for secure and trusted connection from Connector to the Manager. You don't need to provide Anyware Manager certificate if:

- You are using Anyware Manager as it uses a certificate signed by a public CA
- You are using a trusted TLS certificates signed by a public CA when connecting to Anyware Manager.

If Anyware Manager is installed with self-signed certificate or a certificate signed by a public CA that is not trusted by the Connector, you need to provide Anyware Manager Certificate unless `--manager-insecure` flag is used to skip certificate validation for testing purpose.

EXPECTED CERTIFICATE FILE

The certificate supported by the Connector has certain requirements. They are as follows:

The Anyware Connector supports the certificate file in the following form:

- A certificate in the **PEM** format as shown below:

```
-----BEGIN CERTIFICATE-----  
base64encodedcertdata  
-----END CERTIFICATE-----
```

- A certificate file including only a single certificate. For example: - A single self-signed certificate - A root CA certificate - A single leaf certificate that is signed by an existing root CA

The Anyware Connector doesn't support the certificate file in following form:

- A bundle certificate that includes multiple certificates such as root, intermediate, or leaf certificate.
- Leaf certificate that is signed by a different or an untrusted root CA by the Connector.

Installing the Connector on RHEL/Rocky Linux

You can configure the firewall, setup the system, download and install the Anyware connector on RHEL/Rocky Linux. If you are currently using Connector on Ubuntu, it is important to read and understand the differences Connector on RHEL/Rocky Linux introduced, To find out the side by side comparison, see [Difference between Anyware Connector on Ubuntu and RHEL/Rocky Linux](#).

The following sections outlines how to download and install the Connector on **Rocky Linux and RHEL**. There are five main steps involved in this process:

1. [Adding the Connector repository](#)
2. [Configuring the SELinux components](#)
3. [Installing the RPM](#)
4. [Generating the Connector Token](#)
5. [Connecting to a Remote Workstation with a PCoIP Client](#)

Prerequisite Steps

For instructions and documentation on the Connector prerequisite steps when installing on RHEL/Rocky Linux, see [Connector System Requirements](#). It is important to read and address all the prerequisites outlined.

Before you begin

If you are currently using the Anyware Connector on Ubuntu, it is important to read and understand what the differences are between the Connector on Ubuntu and Connector on RHEL/Rocky Linux so you can prepare the installation correctly to minimize errors during installation.

For more information, see [Difference between Anyware Connector on Ubuntu and RHEL/Rocky Linux](#).

1. Adding the Connector Repository

The virtual machine you are adding the repo to must have access to the internet. If it doesn't, you will be unable to download and install the required files.

CHECKING EXISTING REPOSITORIES FOR ANYWARE CONNECTOR

If the Anyware Connector was installed previously on your virtual machine, there could be existing repos related to it on your system. Run the command below to check all existing repos related to Anyware Connector (Skip this step if Anyware Connector was never installed on your virtual machine).

```
dnf repolist teradici-anyware-manager*
```

Check the current Anyware Connector repo to make sure it is the desired repo that you want to use for installation. If there are unwanted repositories on your VM, see [Repository Management](#) to remove them.

ADDING A REPOSITORY

To access the scripts and configure the RHEL and Rocky Linux repository, select the Downloads and scripts option [here](#) and select the **Anyware Connector (RHEL/Rocky Linux)** option. Click **Downloads and scripts** and copy the script to add the Connector repo.

Once you have copied the curl command you need to run it to download the repository.

2. Configuring SELinux Policies

The following SELinux policies enable persistent storage and container logging on the Connector. If SELinux policies are not found, data stored in the Connector will be lost when the virtual machine is shut down.

Once configured, and the installation has verified SELinux, all Connector related data will persist when the target machine hosting the Connector is re-booted. To check if `selinux` is already installed on your system, run the following command:

```
sudo dnf list installed | grep anyware-manager-selinux
```

The output from this command notifies if `selinux` is already running on your system. If it is not, then you need to run the following commands to install the SELinux policies:

1. Run the following command to install the SELinux policies and set the basic framework for persistent database and Vault:

```
sudo dnf install -y selinux-policy-base container-selinux
```

2. Run the following command to install a specific version of SELinux that has been tested for K3s:

```
sudo dnf install -y https://github.com/k3s-io/k3s-selinux/releases/download/v1.1.stable.1/k3s-selinux-1.1-1.el8.noarch.rpm
```

3. Run the following command to install SELinux from the Anyware Manager repo:

```
sudo dnf install -y anyware-manager-selinux
```

3. Installing the Connector RPM

Once you have installed and configured the SELinux policies you must install the Connector RPM and configuration files.

Run the following command to install the Connector RPM, the sample configuration files will be generated once the install is done:

```
sudo dnf install -y anyware-connector
```

4. Generating a Connector Token

You must generate a Connector token using the Admin Console. The steps outlined below must be performed on the target virtual machine.

You need to create or have created a deployment prior to obtaining a token. For information on how to log into the Admin Console, see [Admin Console Connection](#). The following section outlines how to obtain a Connector token using the Admin Console:

1. Click **Connectors** from the console sidebar.
2. Click the add connector button (+ sign located beside **Connectors** heading) to display the connector creation panel.
3. Enter the following information:
 - Select the deployment you want to add the Connector to. If you do not have an existing deployment you need to create one.
 - Enter the name of the Connector.

- Follow the step by step instructions outlined below.

SELECT A DEPLOYMENT

Deployment name

Test_Teradici_1

DEFINE THE CONNECTOR

Connector name

Test_Connector_01

The length is 2 to 32 and character: ~!@#\$%^&*()|+=~?;:~",.<>{}[]/ is not allowed.

Private cloud install instructions

- 1. Create the Cloud Access Connector server**

Create a dedicated Ubuntu server for GCP, AWS, and Private Cloud with the necessary specifications.
- 2. Verify the Cloud Access Connector server**

You need to SSH into the machine and ping the domain and a remote workstation in the domain to verify.
- 3. Enable external access**

Only required if you want to enable remote access to the workstations without requiring a VPN.
- 4. Download the Cloud Access Connector server**

Follow 2 simple steps to connect to the machine and download the Connector installer.
- 5. Get connector token**
- 6. Install the Cloud Access Connector**

When the installer completes, the IP address of the Cloud Access Connector will be displayed.

(token is only valid for 2 hours.)

eyJhbGciOiJIUzUxMiIsInR5cCI6IkpXVCJ9.eyJjb25uZWN0b3JOYW1



4. Click **GENERATE**.

5. Copy the Connector token by click the copy icon.

You can now use this Connector token when prompted during installation.

5. Configuring the Connector-Example Commands

The following section provides example configuration commands for configuring the Connector with Anyware Manager and Anyware Manager as a Service. These example commands use flags, but the same parameters can be configured using the configuration files also.

CONFIGURING THE CONNECTOR FOR ANYWARE MANAGER

Once you have installed the Connector RPM, and have generated a Connector token from the Anyware Manager installed in your enterprise network, run the following commands to configure the Connector to work with the Anyware Manager in your enterprise network. The first line for these commands maps the Connector token to a variable in the shell, the '' for the string values are not required if there are no special chars in the string.

Minimum Configuration Sample Command for Quick Start

The following command with dummy values configures a Connector with minimum flags to work with the Anyware Manager in your enterprise network. Communications with external integrations such as PCoIP clients, Active Directory server, etc are not secure without certificate validation are not secure without certificate validation, this should only be used for testing purpose.

```
export token=<token from Anyware Manager Admin Console>
/usr/local/bin/anyware-connector configure \
--manager-url 'https://ipv4.Anyware.Manager.Installable' \
--token $token \
--domain 'testlab.internal' \
--sa-user 'sampleuser' \
--sa-password 'passwordstring' \
--accept-policies \
--self-signed \
--ldaps-insecure \
--manager-insecure
```

Typical Configuration Sample Command

```
export token=<token from Anyware Manager admin console>
sudo /usr/local/bin/anyware-connector configure \
--manager-url 'https://ipv4.Anyware.Manager.Installable' \
--token $token \
--domain 'testlab.internal' \
--sa-user 'sampleuser' \
--sa-password 'Passwordstring' \
--ldaps-ca-cert '/home/rocky/DC-Cert.pem' \
--computers-dn 'CN=Computers,DC=testlab,DC=internal' \
--users-dn 'CN=Users,DC=testlab,DC=internal' \
--external-pcoip-ip 'public.ipv4.sg.ip' \
--self-signed \
--accept-policies \
--manager-insecure \
--debug
```

- When you are installing the Connector for Anyware Manager you need to ensure that you enable and specify the `--manager-url` flag. This flag specifies the Anyware Manager URL that the Connector connects to. If it is not specified, it points to <https://cas.teradici.com> by default.
- The `--external-pcoip-ip` flag is highly recommended to explicitly set the public IP that PCoIP Clients connects to during PCoIP sessions. This is the public IP that the Connector is listening to on port 4172. The installer reaches out to *cas.teradici.com* and try to automatically resolve the external IP; if this fails, or is not able to resolve the correct IP, this flag is required. In the case that the Connector machine does not have an internet connection, for example in a dark site environment, or the ingress and egress internet traffic are running through different public IPs, this flag is required.
- The `--manager-insecure` flag is only required when the Connector is connecting to a Anyware Manager that is using self-signed certificates. If Anyware Manager is using trusted TLS certificates signed by a public CA, then this flag isn't required.
- The `--manager-ca-cert` flag can be used to provide the PEM formatted public certificate for the root CA used to sign the Anyware Manager certificate. This flag is required when Anyware Manager is using a custom certificate that is not signed by a public CA.
- If this is the first Connector installed in the deployment, use `--computers-dn` and/or `--users-dn` flags to sync AD objects to Anyware Manager. The additional Connector in the same deployment is able to pull the DN(s) configuration from Anyware Manager without providing these flags. If these flags are not provided the AD sync will sync all objects from the AD to the Anyware Manager.
- If `--self-signed` flag is not used, you should use `--tls-key` and `--tls-cert` flags to provide the full path and filename of the TLS key and PEM formatted TLS certificate to use.

- If `--ldaps-ca-cert` flag is not used, you should use either `--ldaps-insecure` to skip certificate validation, or `--enable-ldap-plaintext` for test purposes.

Ensure that you use the options and flags that best suit your system architecture and requirements. If required values are not provided on the command line, you are prompted for them. For additional flags and options, see [Installation Flags and Options](#).

ADDITIONAL CONFIGURATIONS FOR THE ANYWARE CONNECTOR

Updating the Connector

When updating configurations for Anyware Connector using "Configure" command, it restarts to apply the updated configurations and all the active sessions going through the connector are disconnected. This requires users to log in again and reconnect.

Multi-Factor Authentication

When you enable MFA for the Connector for RHEL/Rocky Linux, all PCoIP Clients authenticated through the Connector are prompted to enter MFA credentials. Previously, only the external PCoIP Clients were prompted for MFA information.

Multi-Factor Authentication for the Connector

When installing the Connector you can enable multi-factor authentication (MFA) by running the `--enable-mfa` flag. MFA is disabled by default. If you want MFA to only apply to external connections, you should have separate Connectors. One Connector should be for external connections, where MFA is enabled, and one for internal or direct connections, where MFA is disabled. For steps on how to install the Connector with MFA bypassed for internal connections, see [Installing the Connector for Internal Connections](#). For steps on how to install the external Connector, see [Installing the Connector for External Connections](#).

Ensure that you use the options and flags that best suit your system architecture and requirements. If required values are not provided on the command line, you will be prompted for them. For additional flags and options, see [Installation Flags and Options](#).

Installing the Connector for Internal Connections

The following steps outline how to install the Connector for internal connections to bypass MFA:

1. Prepare a virtual machine in your private network that meets the [system requirements](#) with the following sub-steps:
 - Skip the step for preparing the system for external access.
 - Skip the step for setting up MFA.
2. Install the Connector with the following sub-steps:
 - If you don't have external users, then you could disable security gateway by passing `--enable-security-gateway=false`, otherwise it's set to true enabled by default.
 - Do not set the Public IP using the `--external-pcoip-ip` flag. The Connector will instead return the virtual machines IP address.
 - No MFA flag is required as MFA is disabled by default.
3. Once you have installed the Connector connect to a remote workstation with a [PCoIP Software Client](#) with the following sub-step:
 - In the *Host Address or Code* field enter the private IP of the internal Connector you just installed and log-in.

Installing the Connector for External Connections

The following steps outline how to install the Connector for external connections:

1. Prepare a virtual machine in your private network that meets the [system requirements](#) with the following sub-steps:
 - Skip the step for preparing the system for internal access.
2. Install the Connector with the following sub-steps:
 - Set the Public IP using the `--external-pcoip-ip` flag.
3. Once you have installed the Connector, connect to a remote workstation with a [PCoIP Software Client](#) with the following sub-step:
 - In the *Host Address or Code* field enter the IP address or DNS name of the external Connector you just installed and log-in.

Updating CIDR for Connector Cluster

The default CIDR for Connector Cluster are as follows:

- 10.42.0.0/16 cluster CIDR
- 10.43.0.0/16 Service CIDR
- 10.43.0.10 Cluster DNS

If the default CIDRs conflict with your internal network, use the following flags to update the cluster with different CIDR.

To update, run the following command:

```
sudo anyware-connector configure --cluster-cidr <IP Address> --service-cidr <IP Address> --cluster-dns <IP Address>
```

Example Command with dummy values:

```
sudo anyware-connector configure --cluster-cidr 192.168.10.0/24 --service-cidr 172.16.0.0/16 --cluster-dns 172.16.0.10
```

-->

INSTALLATION FLAGS AND OPTIONS

For detailed information on the installation flags and the configuration file parameters that you can pass during installation, see the table outlined below:

Groups of flags

The flags are here categorized by their configuration groups:

States for Boolean Flags

The state of all the Boolean Flags is interpreted as follows: "--boolean-flag" means "true". "--boolean-flag=true" means "true". "--boolean-flag=false" means "false". "--boolean-flag anytext" uses default as "true".

Anyware Manager

Configuration File Parameter	Flag	Description
<i>caCertPath</i>	<code>--manager-ca-cert</code>	Enables users to supply a CA certificate for Anyware Manager to enable the Connector to trust the certificate in order to connect to the Anyware Manager instance.
<i>insecure</i>	<code>--manager-insecure</code>	This flag is required when the Connector is connecting to a Anyware Manager instance that is using self-signed certificates, and you want to turn off the verification of the certificate.
<i>url</i>	<code>--manager-url</code>	This flag is required for Anyware Manager, Specifies the Anyware Manager URL that the Connector connects to. If this is not specified it points to https://cas.teradici.com by default, which is the URL for Anyware Manager as a Service.
<code>--pull-connector-config</code>	Boolean	This flag gets the Connector configuration from the Anyware Manager.
<code>--push-connector-config</code>	Boolean	This flag saves the Connector configuration into the Anyware Manager.

PCoIP Software Client Flags

Configuration File Parameter	Flag	Description
<code>showAgentState</code>	<code>--show-agent-state</code>	<p>This flag controls if the agent state is displayed as part of the remote workstation name in the PCoIP Client.</p> <p>The default value for this flag is true. Setting the value of this flag to true and the <code>--retrieve-agent-state</code> flag to false results in no agent state displaying. A boolean parameter.</p>
<code>retrieveAgentState</code>	<code>--retrieve-agent-state</code>	<p>Enables the broker to retrieve the agent state for unmanaged and managed remote workstations.</p> <p>The default value for this flag is false. The available states are In Session, Ready, Starting, Stopping, Stopped and Unknown. The value of this flag can either be true or false. A boolean parameter.</p>
<code>ip</code>	<code>--external-pcoip-ip</code>	<p>Sets the public IP for PCoIP Client to PCoIP Agent connection. This is the public IP that the Connector is listening to on port 4172. The installer reaches out to <code>cas.teradici.com</code> and try to automatically resolve the external IP;</p> <p>if this fails, the <code>--external-pcoip-ip</code> flag is required. In the case that the Connector machine doesn't have an internet connection, for example in a dark site environment, or the ingress and egress internet traffic are running through different public IPs, this flag is required. For more information on external network access, see Enabling External Network Access. A string parameter.</p>

Connector

Configuration File Parameter	Flag	Description
<i>acceptPolicies</i>	<code>--accept-policies</code>	Automatically accept the EULA and Privacy Policy .
<i>token</i>	<code>--token (-t)</code>	Required. The token generated from Anyware Manager for Connector to create a service account to connect to Anyware Manager.
<i>licenseServerUrl</i>	<code>--local-license-server-url</code>	Lets the URL for PCoIP License Server to be used for PCoIP Sessions. If this is not provided, ensure that the Cloud License Server is registered on the PCoIP Agent. Example: <code>--local-license-server-url http://10.10.10.10:7070/request</code> . For more information on the PCoIP License Server, see PCoIP License Server . A string parameter.
<i>enableSecurityGateway</i>	<code>--enable-security-gateway</code>	By default the security gateway for external traffic is set to true. For internal traffic disable this feature using the <code>--enable-security-gateway=false</code> flag.

Connector/certificates

Configuration File Parameter	Flag	Description
<i>selfSigned</i>	<code>--self-signed</code>	This mode is not secure and intended for testing only. PColP client will receive a untrusted warning when connecting to the Connector. The previous <code>--insure</code> flag is still supported
<i>keyPath</i>	<code>--tls-key</code>	The full path and filename of the TLS key to use. The <code>--self-signed</code> flag overrides this flag. A string parameter.
<i>certPath</i>	<code>--tls-cert</code>	The full path and filename of the TLS certificate (in PEM format) to use. The <code>--self-signed</code> flag overrides this flag. A string parameter.
<i>trustCustomerLicenseCert</i>	<code>--trust-customer-license-cert</code>	Trusted customer license certificate path.
<i>trustCustomerLicenseKey</i>	<code>--trust-customer-license-key</code>	Trusted customer license key path.

Connector/multifactorAuthentication

Configuration File Parameter	Flag	Description
<i>enable</i>	<code>--enable-mfa</code>	This flag can be used if you wish to enable multi-factor authentication. Multi-factor authentication will be enabled for all connections, both internal and external. Internal users will be required to enter the multi-factor authentication code for the Connector when connecting to the PCoIP Client. It is recommended to install separate Connectors for internal vs external connections. A boolean parameter.
<i>port</i>	<code>--radius-port</code>	This is the RADIUS server port. If not specified, the default port (1812) is used. If <code>--radius-server</code> is specified, then this flag is optional. A string parameter.
<i>server</i>	<code>--radius-server</code>	The FQDN or IP address of the RADIUS server to use for MFA. This flag is optional. A string parameter.
<i>sharedSecret</i>	<code>--radius-secret</code>	The shared secret used for configuring RADIUS authentication. If <code>--radius-server</code> is specified then this flag is required. A string parameter.

deployment/domain/DomainName

Configuration File Parameter	Flag	Description
<i>name</i>	<code>--domain</code>	The AD domain that the remote workstations will join. A string parameter.

deployment/domain/domainControllers

Configuration File Parameter	Flag	Description
<i>domainControllers</i>	<code>--domain-controller</code>	This flag specifies one or more domain controllers to use with the Connector. To specify multiple domain controllers use the following format: <code>--domain-controller dc1.domain.com, --domain-controller dc2.domain.com, --domain-controller dc3.domain.com</code> . A string parameter.

deployment/domain/serviceAccount

Configuration File Parameter	Flag	Description
<i>userName</i>	<code>--sa-user</code>	The AD service account username. A string parameter.
<i>password</i>	<code>--sa-password</code>	The AD service account password. A string parameter.

deployment/domain/adSynch

Configuration File Parameter	Flag	Description
<i>computerDns</i>	<code>--computers-dn</code>	The base DN to search for computers within AD for AD sync. Can specify multiple DNs with multiple options. See the differences between the Connectors at the top of this page for details. Newly provided base DN(s) will automatically replace previous base DN(s).
<i>computerFilters</i>	<code>--computers-filter</code>	The filter to search for computers within Active Directory. Specify multiple filters with multiple options. Default computer filter: (&(primaryGroupID=515)(objectCategory=computer)). A string parameter.
<i>usersDns</i>	<code>--users-dn</code>	The base DN to search for users within AD. Specify multiple DNs with multiple options. Newly provided base DN(s) will automatically replace previous base DN(s). The base DN to search for computers within the AD for AD sync. You can specify multiple DNs with multiple options. See the table above on the differences between the Connectors for more information. Newly provided base DN(s) will automatically replace previous base DN(s). A string array parameter.
<i>usersFilters</i>	<code>--users-filter</code>	The filter to search for users within Active Directory. Specify multiple filters with multiple options. Default user filter: (&(objectCategory=person)(objectClass=user)). A string parameter.
<i>interval</i>	<code>--sync-interval</code>	The interval (in minutes) for how often to sync AD users and computers with the Anyware Service. A uint8 parameter.

deployment/domain

Configuration File Parameter	Flag	Description
<i>caCertPath</i>	<code>--ldaps-ca-cert</code>	To supply a CA certificate for the connection to AD over LDAPS. A string parameter.
<i>insecure</i>	<code>--ldaps-insecure</code>	Skip certificate validation when connecting to the Active Directory using LDAPS. This option should only be used when connecting to the Active Directory deployed with self signed certificates. This will be ignore if a CA cert is provided.
<i>enableLdapMode</i>	<code>--enable-plaintext-ldap</code>	Connections to Active Directory will be made using plaintext LDAP instead of encrypted LDAPS. This is meant only for testing, do NOT use it in production.
<i>poolGroups</i>	<code>--pool-group</code>	Specifies one or more Active Directory groups, by entering the distinguished name (DN), to be assigned to pools for remote workstation management (eg, <code>--pool-group 'CN=GroupPool1,CN=Users,DC=sample,DC=com'</code> <code>--pool-group 'CN=GroupPool2,CN=Users,DC=sample,DC=com'</code>). A string parameter.
N/A	<code>--preferred-name</code>	This is an optional flag to determine if the hostname or machine name should be displayed to identify the remote workstations, the default is set to display machine name.

These configuration parameters are only applicable for the Connector on RHEL/Rocky Linux.

Troubleshooting the Connector

If you encounter issues when attempting to install the Connector, please see the Troubleshooting section for information on how to potentially diagnose the specific issue. You can also view the following KB article [here](#) which provides a list of troubleshooting steps for common issues related to installing the Connector. For information on installer errors related to a change in the distribution system, see [Installer Issues](#).

6. Connecting to a Remote Workstation with a PCoIP Client

After successfully installing a Connector, you can initiate a session to connect to a remote workstation with a PCoIP Software Client. We enable customers to use multi-factor authentication for

these PCoIP Client sessions. The following steps outline how to connect to a remote workstation using the PCoIP Software Client:

1. Double-click the PCoIP Client desktop icon or program file `PCoIPClient` to launch the application.
2. In the *Host Address or Code* field, enter one of the following:
 - For direct connections, provide the address of the host machine.
 - For managed connections, provide the address of the connection manager.
3. Click **NEXT**.
4. Select your domain and enter the credentials for the remote workstation. If you have enabled MFA then you will be prompted for the 2nd factor passcode. The method of how this passcode is communicated depends on the provider you used. It is usually either a One Time Password or push notification.
5. Click **LOGIN**.
6. If your login is successful you should be able to select the remote workstation and connect to it. Please note that if you have a single remote workstation, that remote workstation is automatically selected and the connection is initiated immediately. In this case you will not be presented with a remote workstation selection screen.

For more information about the PCoIP Software Client, please see the following PCoIP Software Client guides:

- [PCoIP Software Client for Windows](#)
- [PCoIP Software Client for macOS](#)
- [PCoIP Software Client for Linux](#)

Upgrading the Connector on RHEL/Rocky Linux

The Anyware connector on RHEL/Rocky Linux can be upgraded in a 2-step process outlined as follows:

Upgrading a Connector

It is not possible to upgrade a Connector installed on Ubuntu to a Connector installed on RHEL or Rocky Linux. To replace a Connector installed on Ubuntu, you must install the RHEL/Rocky Linux Anyware Connector on a new virtual machine and configure it exactly the same as the existing Connector on Ubuntu.

1. You must install the new version of the Connector RPM:

```
sudo dnf upgrade -y anyware-connector
```

2. Run the following command to upgrade the Connector with the current configuration:

```
sudo /usr/local/bin/anyware-connector upgrade
```

Once you have successfully upgraded the Connector you should see a response similar to the example output outlined below.

```
sudo /usr/local/bin/cas-connector upgrade
INFO Starting cas-connector version=22.04.0-rc0-18-g5825b44 built on 2022-01-26
INFO Upgrading
INFO Extracting Manifest
WARN namespaces "connector" already exists
WARN namespaces "ingress-nginx" already exists
WARN namespaces "logging" already exists
INFO Beginning Upgrade
INFO Deploying CAS Connector service
INFO Deploying Cloud Access Software Connector. This process usually takes 5 to 10 minutes to complete
INFO Performing Cloud Access Software Connector health probe. This process usually takes 1 to 5 minutes to complete
INFO ***** Connector installation complete *****
INFO The IP address of your connector ip=
INFO Please visit CAS Manager to further manage your connector Cloud Access Software Connector Url=https://10.0.0.2
```

Installing the Connector on RHEL/Rocky Linux- Darksite Installation

In cases where the Connector needs to be installed in a **Darksite** (i.e. an environment without internet access, also known as **airgap** or **offline** environment) you will need to download the installation files, transfer them to the target Darksite machine, and then run the installation script.

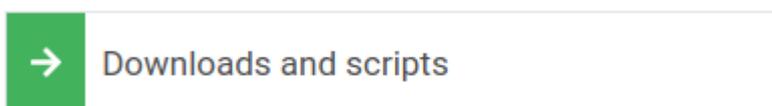
Prerequisite Steps

Before you begin, see [Connector System Requirement on RHEL/Rocky Linux](#) to prepare your target machine.

1. DOWNLOAD AND TRANSFER THE INSTALLATION FILES

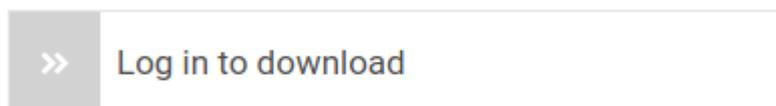
Once you have access to a virtual machine with internet access, download the darksite installation package. To download directly as a `tar.gz` file from the [Anyware Manager product release](#) page and follow the steps below:

Navigate to the **Cloud Access Connector (RHEL/Rocky Linux)** section and click the **Downloads and scripts** button.



Note: An account is required

If you are not logged in, you should see a log in prompt instead:



You can create an account when you click this button if you do not already have one.

- Read and accept the HP End User License Agreement.

2. TRANSFERRING THE FILE

Once you have downloaded the `.tar.gz` file, transfer it to the target darksite machine. For system requirements of the target virtual machine.

To transfer the file you can copy it onto a media device, such as a USB drive or a DVD, and then connect that device to the target darksit machine. You can also connect the target darksite machine to another machine via SSH or FTP, and complete a network file transfer. This method may not be viable for some darksite networks.

3. EXTRACT THE INSTALLATION FILE

Once the `.tar.gz` file has been transferred to the target darksite machine, extract the downloaded file by running the following command:

```
sudo tar xzvf anyware-connector-offline_Linux.tar.gz
```

When you extract the file, a new folder called `anyware-connector-offline_linux` is available and it contains the following two files:

- `anyware-connector-offline-deps.tar.gz`
- `install.sh`

The `install.sh` file contains the installation bash script and the `anyware-connector-offline-deps.tar.gz` file contains the RPM dependencies and Anyware Connector images.

4. INSTALL ANYWARE CONNECTOR OFFLINE

To install the Anyware Connector offline, run the installation script:

```
cd /PATH_OF_EXTRACTED_INSTALLATION_FILES
sudo ./install.sh
```

Anyware Connector RPM is now installed.

Installation Errors

The Darksite installation could fail due to a package conflicting or checksum error if there is an existing package already present on the target machine. To resolve this, you need to delete the conflicting package and re-run the installation script.

5. CONFIGURE ANYWARE CONNECTOR

To install the remaining components and configure Anyware Connector, see [Configuring Anyware Connector](#)

Reference

Anyware Connector Features

Updating the Connector

When updating Anyware Connector, it restarts to apply the updated configurations and all the active sessions going through the connector are disconnected. This requires users to log in again and reconnect. The only configuration update that does not require a Connector restart is running the diagnose command.

Items	Connector on RHEL/Rocky Linux
Operating System	RHEL/Rocky Linux 8.x
Packaging	RPM Package
Connector Configuration	Configuration files and/or command line flags and parameters.
Required Configuration Flags	<pre> --token --domain --sa-user --sa-password --accept-policies --self-signed (or --tls-key and --tls-cert must be provided) --ldaps-ca-cert (or --ldaps-insecure or --enable-ldap-plaintext) --external-pcoip-ip 'public.ipv4.sg.ip' </pre>
MFA Configuration	All connection requests both internal and external will require MFA credentials to be entered.
Federated User Authentication/SSO	Not supported in v23.04.0, will be available in the future version.
Active Directory LDAPS Certificate	<p>The Active Directory CA certificate must be provided to the installer by entering the information with the <code>--ldaps-ca-cert</code> parameter or by setting it in the configuration file.</p> <p>Skip the certificate validation when connecting to the Active Directory using the following flag <code>--ldaps-insecure</code>.</p> <p>For testing purposes the AD connection can use ldap in the plaintext form with the <code>--enable-ldap-plaintext</code> flag.</p>
Diagnose Commands	Diagnose commands has two flags <code>--health</code> to check the overall status of Anyware Connector and <code>--support-bundle</code> to generate support bundle.
Key path and Certificate path flag	<code>--tls-key</code> and <code>--tls-cert</code>
Installation Commands	<p>Add the repository and install the Connector RPM with the following command: <code>sudo dnf install -y anyware-connector</code>.</p> <p>Configure the Connector with flags or configuration files using the following command: <code>sudo /usr/local/bin/anyware-connector configure {flags or path to config file}</code>.</p> <p>The <code>configure</code> command fails with a missing parameter error if the mandatory flags or parameters are missing, the mandatory flags are <code>--token</code>, <code>--domain</code>, <code>--sa-user</code>, <code>--sa-password</code>, <code>--ldaps-ca-cert</code> (or must provide <code>ldaps-insecure</code> or <code>--enable-ldap-plaintext</code>), <code>--self-signed</code>(or must provide <code>--tls-key</code> and <code>--tls-cert</code>).</p>

Items	Connector on RHEL/Rocky Linux
Update Configuration	Update the configuration using: <code>sudo /usr/local/bin/anyware-connector configure {flags or path to config file} command</code> .
Upgrade Commands	<code>sudo dnf update anyware-connector</code> and <code>sudo /usr/local/bin/anyware-connector upgrade</code>
Internal/External Session Detection	In most cases the Connector on RHEL/Rocky Linux works without any special configuration, but if you know the Connector on RHEL/Rocky Linux is only for LAN connections, it is recommended to set the <code>--enable-security-gateway</code> flag to false by using <code>--enable-security-gateway=false</code> .

Difference between Anyware Connector on Ubuntu and RHEL/Rocky Linux

Anyware Connector on RHEL/Rocky Linux stands out from the Connector on Ubuntu. Here is a feature comparison between two Connectors.

Items	Connector on Ubuntu	Connector on RHEL/Rocky Linux
Operating System	Ubuntu 18.04	RHEL/Rocky Linux 8.x
Packaging	tar file	RPM Package
Deployment	Docker Swarm	Kubernetes
Connector Configuration	Configuration files and/or command line flags and parameters.	Configuration files and/or command line flags and parameters.
Required Configuration Flags	<pre>--token --domain --sa-user sa-password --accept-policies --self-signed (or --ssl-key and --ssl-cert)</pre>	<pre>--token --domain --sa-user --sa-password --accept-policies --self-signed (or --tls-key and --tls-cert must be provided) --ldaps-ca-cert (or --ldaps-insecure or --enable-ldap-plaintext) --external-pcoip-ip 'public.ipv4.sg.ip'</pre>
MFA Configuration	When MFA is enabled all connection requests from internal PCoIP Clients will have MFA bypassed.	All connection requests both internal and external will require MFA credentials to be entered.
Federated User Authentication/SSO	Available	Not supported in v23.04.0, will be available in the future version.
Active Directory LDAPS Certificate	If <code>--ldaps-ca-cert</code> is not provided during installation, the Active Directory CA certificate is automatically collected by the Connector by connecting to each DC on the LDAPS port, and the certificate is saved to the Connectors CA certificate store.	<p>The Active Directory CA certificate must be provided to the installer by entering the information with the <code>--ldaps-ca-cert</code> parameter or by editing the configuration file.</p> <p>Skip the certificate validation when connecting to the Active Directory using the following flag <code>--ldaps-insecure</code>.</p> <p>For testing purposes the Active Directory connection can use ldap in the plaintext form with the <code>--enable-ldap-plaintext</code> flag.</p>
Diagnose Commands	You can diagnose remote workstation connectivity, and Active Directory connectivity	Diagnose commands has two flags <code>--health</code> to check the overall status of Anyware Connector and <code>--support-bundle</code> to generate support bundle.

Items	Connector on Ubuntu	Connector on RHEL/Rocky Linux
	by running the <code>diagnose</code> command.	
Key path and Certificate path flag	<code>--ssl-key</code> and <code>--ssl-cert</code>	<code>--tls-key</code> and <code>--tls-cert</code>
Installation Commands	<p>Download the installer from our website and extract the package, then run the install command with the required flags: <code>sudo /usr/sbin/cloud-access-connector install {flags}</code>.</p> <p>The installer prompts for mandatory flags if you do not provide them in the command.</p>	<p>Add the repository and install the Connector RPM with the following command:</p> <pre>sudo dnf install -y anyware-connector.</pre> <p>Configure the Connector with flags or configuration files using the following command: <code>sudo /usr/local/bin/anyware-connector configure {flags or path to config file}</code>.</p> <p>The <code>configure</code> command will fail with a missing parameter error if the mandatory flags or parameters are missing, the mandatory flags are <code>--token</code>, <code>--domain</code>, <code>--sa-user</code>, <code>--sa-password</code>, <code>--self-signed</code> (or must provide <code>--tls-key</code> and <code>--tls-cert</code>), <code>--ldaps-ca-cert</code> (or <code>--ldaps-insecure</code> or <code>--enable-ldap-plaintext</code>).</p>
Update Configuration	<code>cd /usr/sbin sudo cloud-access-connector update {flags to be updated}</code>	Update the configuration using: <code>sudo /usr/local/bin/anyware-connector configure {flags or path to config file} command</code> .
Upgrade Commands	<code>cd /usr/sbin sudo cloud-access-connector update {flags to be updated}</code>	<code>sudo dnf update anyware-connector</code> and <code>sudo /usr/local/bin/anyware-connector upgrade</code>
Internal/External Session Detection	Typically the Connector on Ubuntu works without any special configuration, but in some cases you may need to explicitly set the <code>--internal-client-cidr</code> and <code>--external-client-cidr</code> so that sessions get treated correctly (eg, NATing external connections from a Firewall).	In most cases the Connector on RHEL/Rocky Linux works without any special configuration, but if you know the Connector on RHEL/Rocky Linux is only for LAN connections, it is recommended to set the <code>--enable-security-gateway</code> flag to false by using <code>--enable-security-gateway=false</code>

Items	Connector on Ubuntu	Connector on RHEL/Rocky Linux
Connector Cluster Network	<code>--connector-network-cidr</code> is the CIDR flag to use for the Connector's docker network. The default docker network subnet is 10.101.0.0/16.	There are three flags to use for the Connector's network. They are; <code>--cluster-cidr</code> to set cluster CIDR,default is 10.42.0.0/16, <code>--service-cidr</code> to set service CIDR, default is 10.43.0.0/16. and <code>--cluster-dns</code> to set cluster dns ip address, default is 10.43.0.10, it has to be part of of the service-cidr.

Transitioning Anyware Connectors

It is not possible to migrate directly from the Anyware Connector on Ubuntu to the Anyware Connector on RHEL/Rocky Linux as they run on different operating systems. The best method to transition to the Connector on RHEL/Rocky Linux is to create this new Connector using the same Anyware Manager deployment you used for the Connector on Ubuntu.

Minimize Transition Downtime

The Connector on RHEL/Rocky Linux can co-exist with the Connector on Ubuntu in the same Anyware Manager deployment. To minimize downtime, it is recommended that you run the newly created RHEL/Rocky Linux Connector for a period of time to ensure it is working properly before decommissioning the Connector on Ubuntu.

MFA CONFIGURATION

When you enable MFA for the Connector for RHEL/Rocky Linux, all PCoIP Clients authenticated through the Connector will be prompted to enter MFA credentials. Previously with the Connector on Ubuntu, internal and external clients had different MFA configurations. If you want to have the same MFA configuration for the Connector on RHEL/Rocky Linux as the Connector on Ubuntu, you must install multiple Connectors on RHEL/Rocky Linux.

TRANSITIONING THE CONNECTOR

The following steps outline how to transition to the Connector on RHEL/Rocky Linux:

1. Before you install the RHEL Connector, ensure you have met all the required prerequisite steps. For instructions and documentation on the Connector prerequisite steps when installing the RHEL Connector, see [Connector System Requirements](#). It is important to read and address all the prerequisites outlined.
2. Review the differences between the Connector on RHEL/Rocky Linux and Ubuntu, as outlined [here](#).
3. Prepare your Connector configuration files. For information on configuring your Connector, see [Configuring the Connector](#).
4. When generating the Anyware Connector token for the new Connector, ensure you use the same Anyware Manager deployment as the existing Connector on Ubuntu. For information on generating the Connector token, see [Generating a Connector Token](#).

5. Install and configure the Connector on RHEL/Rocky Linux. For information on installing and configuring the Connector, see [Installing the Connector](#).

TESTING THE CONNECTOR

Once you have installed the Connector on RHEL/Rocky Linux you should test it and ensure it has been correctly installed and configured. The following steps outline how to test the Connector:

1. Run the following command to check that all installed services are running:

```
sudo /usr/local/bin/kubectl get pods -c connector
```

2. Access the virtual machine where you have the PCoIP Client installed and establish a connection using the Connector IP or FQDN. If this connection is successful then it confirms the Connector has been installed correctly. If it is not, you should re-check the virtual machine configuration and Connector configuration.

ADDING THE CONNECTOR TO A LOAD BALANCER

If the original Connector on Ubuntu was configured with a load balancer, you need to add the new Connector on RHEL/Rocky Linux to the load balancer. Once you have tested the Connector on RHEL/Rocky Linux install, and are happy that it was successful, you can remove the Connector on Ubuntu.

Proxy Configuration for Anyware Connector

Disable Proxy Configuration

Once all installations and configurations are done, Anyware Connector could run into some issues related to proxy. To avoid this, the proxy must be disabled on the Anyware Connector workstations. To disable proxy:

1. Check the proxy settings saved in the cluster:

```
sudo /usr/local/bin/kubectl edit secret proxysettings -o yaml -n connector
```

2. Look for strings such as `HTTP_PROXY`, `HTTPS_PROXY`, `NO_PROXY`.
3. Press the letter "i" to edit the keys to set them to empty string by doing the following:

```
HTTP_PROXY: ""  
HTTPS_PROXY: ""  
NO_PROXY: ""
```

if you do not see one of those strings change the rest to empty string "".

4. Save the new configuration by pressing "ESC" then ":" then "wq".

Reference

Scaling and PCoIP Session Limits

When using Anyware Manager there are certain session establishment and session bandwidth limits when dealing with external connections.

The following table outlines the RAM, vCPU and correlated estimated bandwidth support:

vCPUs	RAM	Estimated Bandwidth
2vCPU	7.5 GB RAM	~ 365 Mbit/s
4vCPU	15 GB RAM	~ 830 Mbit/s
8vCPU	30 GB RAM	~ 1100 Mbit/s

Estimated Bandwidth

These are estimated bandwidth levels. The bandwidth can vary based on the host, OS, CSP, etc.

1100 Mbit/s is approximately the maximum bandwidth that can be achieved. Additional gains may be possible with larger sizing.

Firewall and Load Balancing Considerations

Anyware Manager and the Connector require certain ports to be open to enable connections between the Anyware Manager, Connector, Remote Workstations, as well as other components.

Ports and Component Connections

Component	Allow	Port/Protocol	Source/ Destination Component	Descriptions
Connector	Inbound	443 TCP	From PCoIP Clients and administrative web browsers.	For users to negotiate connections to their remote workstations. For accessing the Management Interface for (legacy) management of Anyware Manager.
Connector	Outbound	443 TCP	To CAM Service, PCoIP Cloud License Server and to SumoLogic .	To sync AD information to the CAM service and call Anyware Manager APIs related to negotiating PCoIP sessions. To verify license activation code during the Connector installation. For log aggregation for support purposes.
Connector	Outbound	60443 TCP	To remote workstations.	Prepares PCoIP Agents for a new user session.
Connector	Inbound	4172 TCP/UDP	From PCoIP Clients.	For PCoIP Sessions with users that are outside of the corporate network.
Connector	Outbound	4172 TCP/UDP	To remote workstations.	For PCoIP Sessions with users that are outside of the corporate network.
Connector	Outbound	636 TCP	To Domain Controllers.	To authenticate users, and query user and computer information.
Connector	Outbound	1812 UDP (This port is configurable)	To RADIUS Server.	For authentication against RADIUS Server.
Connector	Outbound	53 TCP/UDP	To DNS.	Domain name resolution.
PCoIP License Server	Inbound	7070 TCP (This port is configurable)	From remote workstations.	For license activation and verification from PCoIP Agent if the PCoIP License Server is used instead of the Cloud License Server.

Port and Component Notes:

- Port **443 TCP** is not required if the PCoIP License Server is used in place of the Cloud License Server.
- The RADIUS Server is optionally configured.
- See the PCoIP License Server guide for [changing port](#) and [configuring TLS encryption](#).

Health Check Endpoint

The following URI endpoint can be used for the Anyware Manager and Connector's health check:

```
/health
```

You can use the `curl` command to verify the health check status and run it on a console. The following command is an example of using the `curl` command:

```
curl -k https://cac-machine.local:443/health
```

- If the command is successful, you will see the following response:

```
{"code":200,"status":"success"}
```

- If the command fails, you will see the following response:

```
{"code":500,"status":"Error","reason":"Cannot communicate with broker"}
```

The following table outlines the list of possible errors and the associated status codes for the `/health` endpoint:

Status Code	Status	Example	Issue
200	success	<code>{"code":200,"status":"success"}</code>	N/A
500	error	<code>{"code":500,"status":"Error","reason":"Cannot communicate with broker"}</code>	Failure to communicate to Broker.
500	error	<code>{"code":500,"status":"Error","reason":"Security Gateway is enabled but does not respond"}</code>	Failure to communicate to Security Gateway.
500	error	<code>{"code":500,"status":"Error","reason":"[error-related-for-configuration]"}</code>	Misconfiguration for the Connection Manager

Anyware Connector Multi-Factor Authentication

Duo Authentication

If you wish to use Duo authentication with Anyware Connector you will be required to setup an authentication server provided by Duo. For more information on this, see [Duo Authentication Proxy - Reference](#).

Duo Authentication Version

The Connector was tested with Duo version **2.4.21**.

The following are key items in the *authproxy.cfg* file that are relevant for the Anyware Connector configuration:

```
[duo_only_client]
[radius_server_duo_only]
ikey=<integration key for duo>
skey=<secret key for duo>
api_host=<host used for duo>
radius_ip_1=<cac connection server ip>
radius_secret_1=<shared secret for above>
radius_ip_2=<cac connection server ip2>
radius_secret_2=<shared secret for above>
port=1812
```

For further information on the above integration, see [RADIUS Duo Only](#).

Azure MFA Authentication

Microsoft Azure MFA Component Versions

We tested the Connector with Microsoft Azure MFA on **November 15th 2019** with the following components.

HP component versions:

- PCoIP Software Client for Windows 19.11.
- Connector with MFA flag enabled.
- PCoIP Standard/Graphics Agent 19.11.

3rd party component versions:

- Azure Active Directory Premium or Microsoft 365 Business offering to use Azure MFA.
- Network Policy Server (NPS) acting as the RADIUS server.
- NPS extension **1.0.1.32**.
- Microsoft Authenticator App **1911.7724** (Android/iOS).

Using different versions may result in different behavior and has not been tested by us.

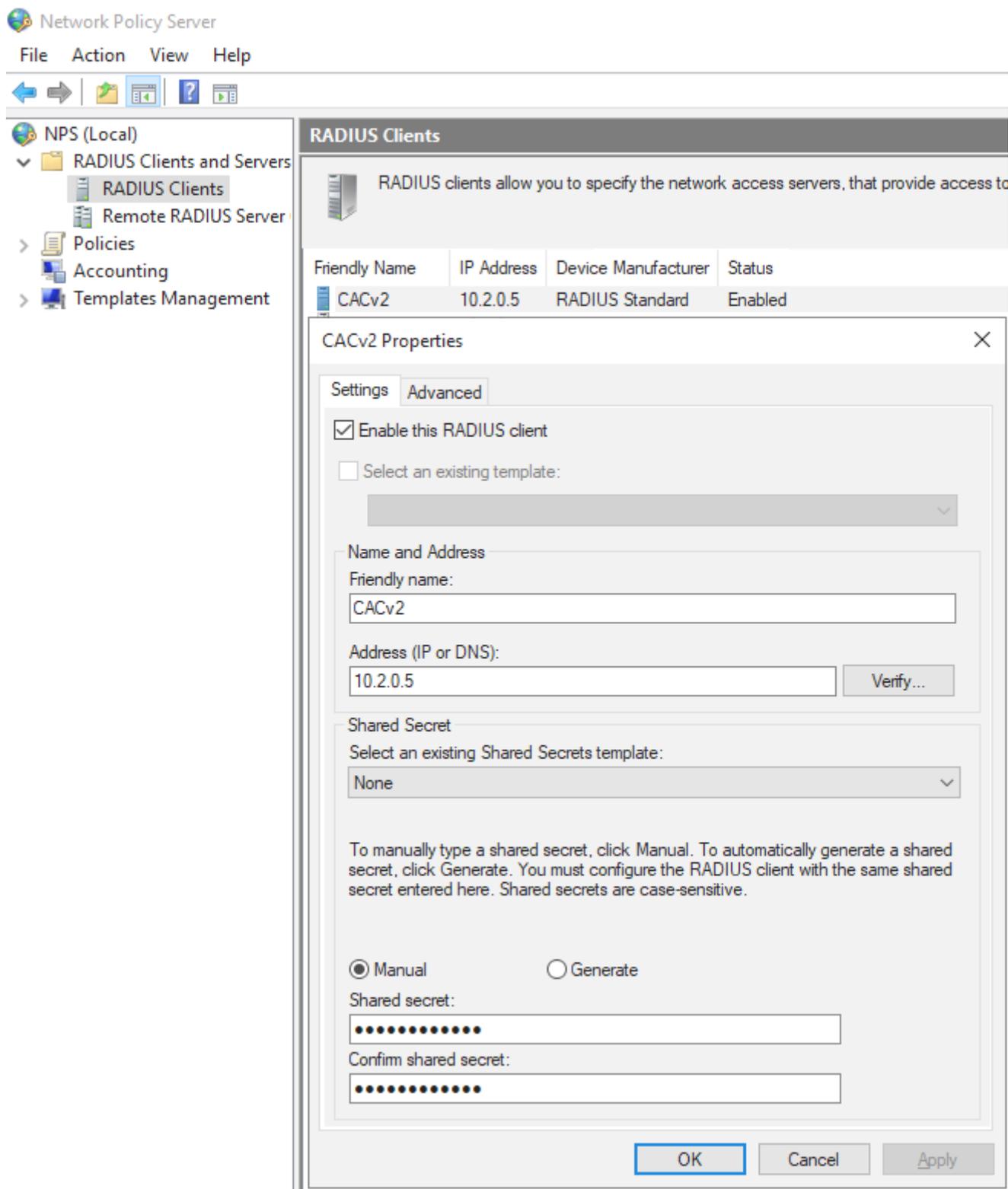
AZURE MFA CONFIGURATION

If you wish to use Azure MFA with the Connector you need to configure a number of 3rd party components. The following steps outline this process:

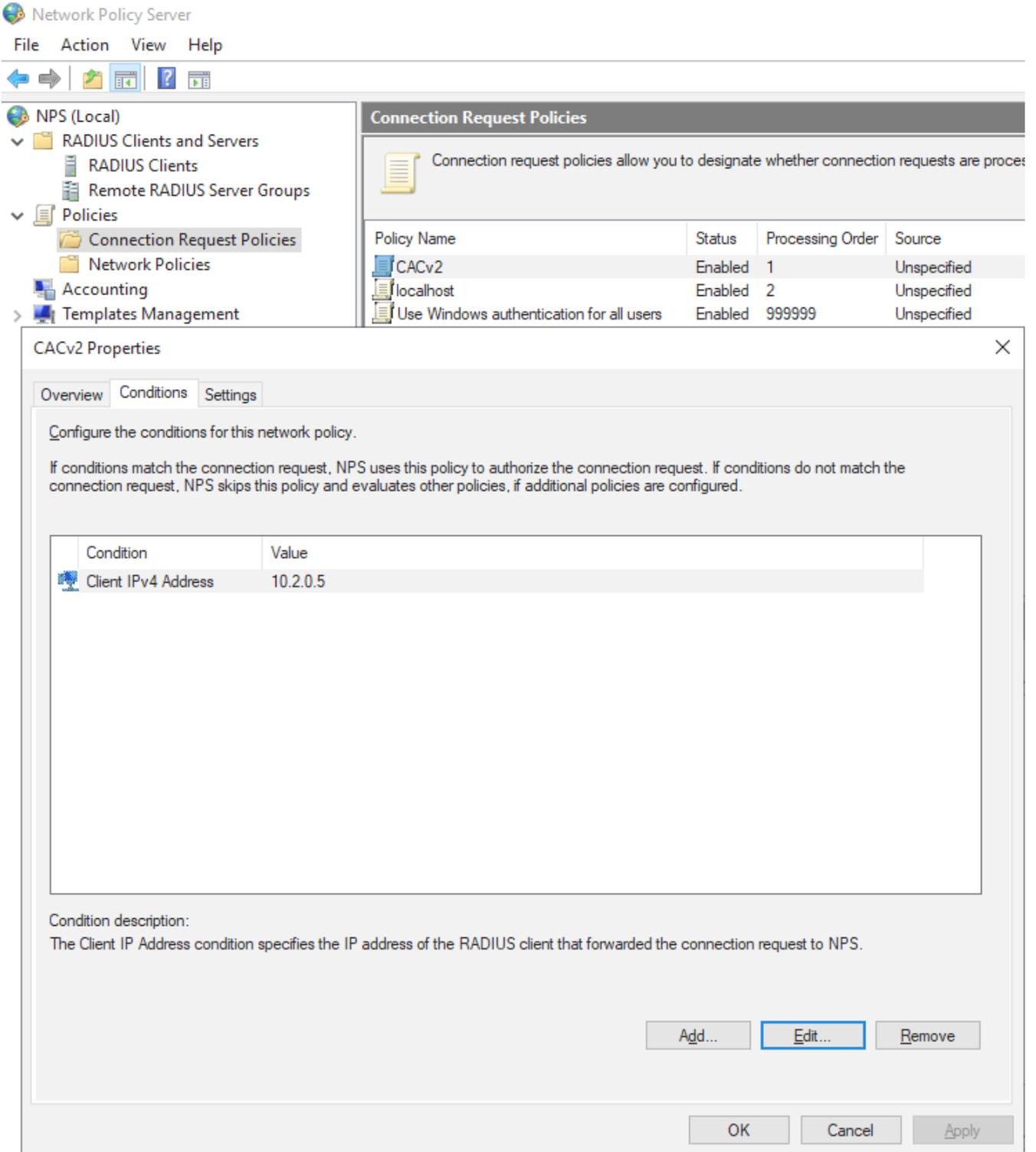
1. From within the Azure portal click **Azure AD**.
2. Click **Enable MFA for target users**.
3. Install the [Microsoft Authenticator App](#) on an Android or iOS mobile device.
4. Ensure that if the users requiring MFA are not yet populated in Azure AD, that you setup Azure AD Connect to sync On-Premises users to Azure.
5. Install Network Policy and Access role on Windows Server 2016 or 2019.
6. Install Network Policy Server (NPS) extension for Azure MFA.
7. Register NPS to Active Directory to enable it to query the list of users.

Once you have registered the NPS you need to configure the server. The following steps outline the NPS configuration:

1. From within the NPS console click **RADIUS Clients**.
2. Add the Connector IP address and Shared Secret and click **OK**.



3. Click **Policies > Connection Request Policies** and add a new policy name and click **OK**.
4. From the **Conditions** tab add the Client IPv4 Address of the Connector and click **OK**.



5. From the **Settings** tab under **Authentication** click *Accept users without validating credentials*.
6. Restart NPS services to enable these changes to take effect.

Configuring the Active Directory for Anyware Connector

We recommend having a single Active Directory configuration for a single deployment, that means all Connectors within that deployment should be configured to the same Active Directory. If you want to have multiple Connectors with different Active Directory settings then you need to ensure that each Connector belongs to a separate deployment. If you create two Connectors that are associated with the same deployment then both will use the same Active Directory sync settings, and the configuration of the last Connector created will take precedence.

Configuring User and Computer Active Directory Distinguished Names

The Connector can optionally be configured to use specific Distinguished Names (DNs) when querying Active Directory for users and computers. This has been extended to be available when running the `update` command in addition to the `install` command.

The following is an example of the DN string format: `CN=Manager`

`Admins,CN=Users,DC=example,DC=com`. You can also configure the frequency at which the Connector syncs this data with the Manager service, as outlined in the following table:

Flag	Type	Description
<code>--users-dn</code>	String	The base DN to search for users within Active Directory. This option may be specified multiple times to provide multiple DNs.
<code>--computers-dn</code>	String	The base DN to search for computers within Active Directory. This option may be specified multiple times to provide multiple DNs.
<code>--sync-interval</code>	String	The interval time in minutes for how often to sync Active Directory users and computers with the Manager service. It must be at least five minutes.
<code>--users-filter</code>	String	The filter to search for users within Active Directory. Specify multiple filters with multiple options. Default user filter: <code>(&(objectCategory=person)(objectClass=user))</code> . An example for a user group filter: <code>(&(objectCategory=person)(objectClass=user)(memberOf: 1.2.840.113556.1.4.1941:=CN=PCoIP Users Group,CN=Users,DC=example,DC=com))</code> .
<code>--computers-filter</code>	String	The filter to search for computers within Active Directory. Specify multiple filters with multiple options. Default computer filter: <code>(&(primaryGroupID=515)(objectCategory=computer))</code> .

These flags outlined are optional and may be provided with the `install` or `update` commands. If you are updating a Connector you only need to provide these flags if you want to changing the DN settings associated with that Connector. If you do not add these flags when performing an update then the Connector will retain the same settings.

You can reset user or computer DNs to their default values by providing an explicit DN with a wider scope than the original DN used.

Configuring Active Directory Pool Groups

A set of command line flags enables users to update Active Directory pool groups. These flags apply changes to the Active Directory settings of the Connector.

By providing the following flags the appropriate update gets applied to the Connector settings. If no command-line option is provided, the Connector will display all available options for this operation.

Flag	Type	Description
<code>--manager-insecure</code>	String	Skips certificate validation when connecting to Anyware Manager as a Service. This option should only be used when connecting to Anyware Manager as a Service deployed with self-signed certificates.
<code>--pool-group</code>	String	Adds specified Active Directory group to the existing pool group settings. By providing all the existing pools groups in the Connector, settings would get replaced by the user specified ones.
<code>--remove-pool-group</code>	String	Removes specified pool Active Directory group by its DN. This flag is not supported by the Connector on Rocky Linux/RHEL.
<code>--clear-pools-groups</code>	String	Clears all pools Active Directory groups. This operation is exclusive and cannot be combined with <code>--remove-pool-group</code> or <code>--add-pool-group</code> . This flag is not supported by the Connector on Rocky Linux/RHEL
<code>--get-cam-settings</code>	String	Prints all Anyware Manager as a Service settings to Admin console.

Security

Multi-Factor Authentication (MFA)

Anyware Connector supports Multi-Factor Authentication (MFA) for PCoIP client sessions. The Anyware Connector MFA implementation is based on the RADIUS protocol. Customers can leverage their existing RADIUS server installation to enable MFA for Anyware Connector deployments. The following MFA scenario's have been tested with specific versions of the MFA software in question. Different versions may not yield the same results and may lead to different behavior.

Multi-Factor Authentication with Duo

Duo Authentication Version

The Connector was tested with Duo version **2.4.21**.

In regards Duo authentication, the following information is configured in the `authproxy.cfg` file. When installing the Connector it will require the following information to configure the Duo Radius server:

- Radius Client IP (Connector IP)
- Radius Server Port
- Radius Shared Secret
- Duo authentication settings (ikey, skey and api host)

Multi-Factor Authentication PCoIP Client Support

Android PCoIP clients do not presently support RADIUS MFA.

For information on enabling Duo authentication with Anyware Connector, see [Anyware Connector Multi-Factor Authentication](#).

Multi-Factor Authentication with Azure

Microsoft Azure MFA Component Versions

We tested the Connector with Microsoft Azure MFA on **November 15th 2019** with the following components.

HP component versions:

- PCoIP Software Client for Windows 19.11.
- Connector with MFA flag enabled.
- PCoIP Standard/Graphics Agent 19.11.

3rd party component versions:

- Azure Active Directory Premium or Microsoft 365 Business offering to use Azure MFA.
- Network Policy Server (NPS) acting as the RADIUS server.
- NPS extension **1.0.1.32**.
- Microsoft Authenticator App **1911.7724** (Android/iOS).

Using different versions may result in different behavior and has not been tested by us.

Azure MFA can successfully be used as a 2nd factor tool for authenticating into the Connector. The following components are required to enable this MFA set-up:

- Azure Active Directory Premium or Microsoft 365 Business offering to use Azure MFA.
- Network Policy Server (NPS) acting as the RADIUS server.
- NPS extension **1.0.1.32** for Azure MFA sending requests from NPS to Azure MFA cloud service.
- Microsoft Authenticator App **1911.7724** (Android/iOS) to receive Push or to generate a Passcode.

Generated Passcode is not usable with Connector and Azure MFA

Only Microsoft Authenticator App Push Notification is supported due to Azure MFA using [Modern Authentication](#). Selecting **Send Me a Push** or **Submit Passcode** triggers a push notification on your Microsoft Authenticator App. You will successfully connect to your PCoIP Session once you approve the push on your Android/iOS device.

For further information on configuring the required 3rd party components to enable Azure MFA with Connector, see [Anyware Connector Multi-Factor Authentication](#).

Third-Party Multi-Factor Authentication

It is possible to integrate third-party MFA applications with Anyware Manager and Anyware Software. we have tested MFA integrations with certain applications and versions of Anyware Software, within specific environments. The links outlined below point to knowledge base articles that outline the processes involved in setting up these specific integrations.

Third-Party MFA Information

The knowledge base articles contain steps and processes that were accurate at the time of testing. Third-party applications may get updated or change without notice, and not behave as the instructions describe. In this case, please let us know so that we can review, investigate and update these procedures. Different combinations or versions of applications may behave differently than described, or may not work. Anyware Manager is also compatible with MFA solutions that support RADIUS. However, not all functions may work, and some of these solutions using RADIUS may behave differently and not work.

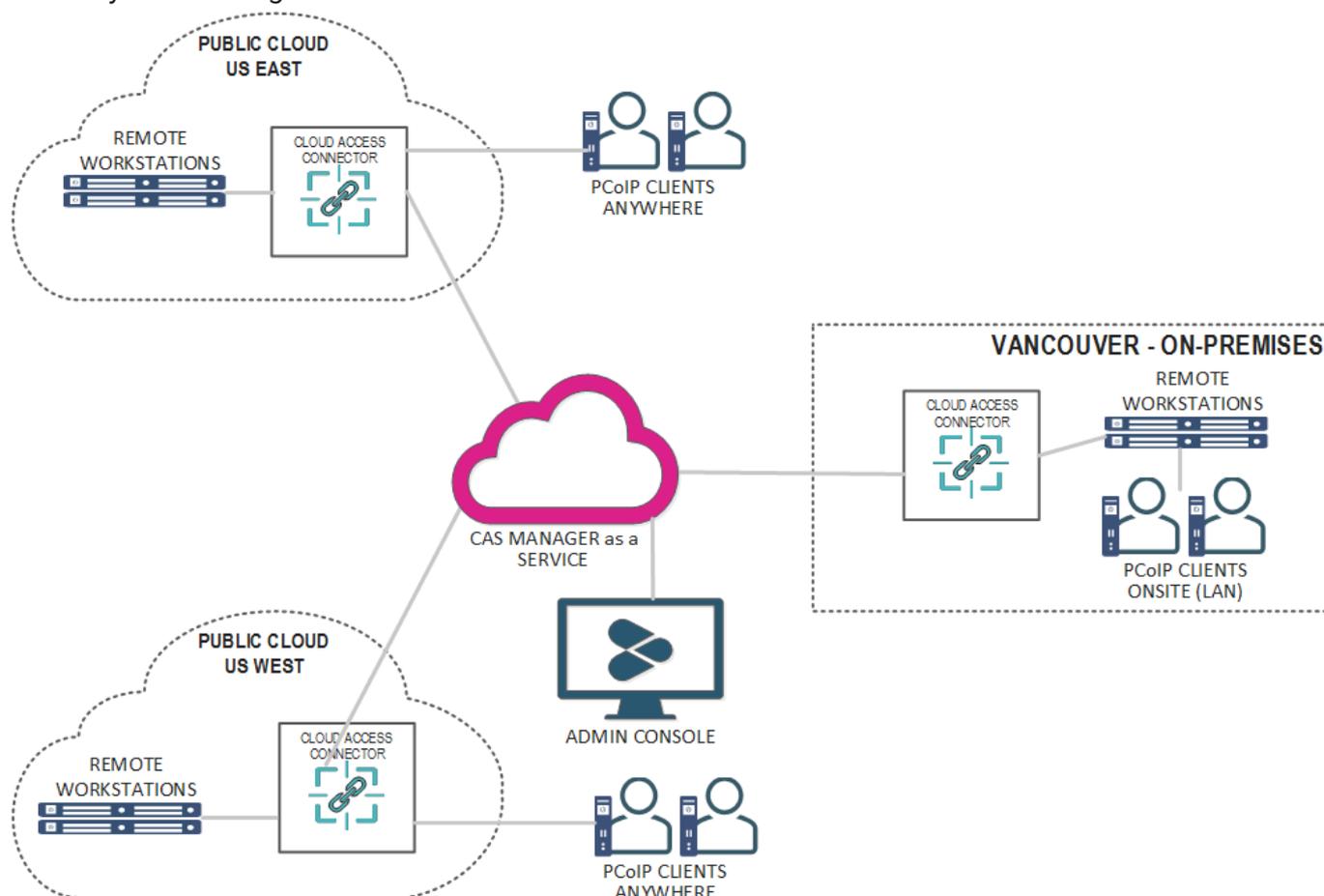
- [Anyware Software - Okta MFA Integration in GCP](#)

Admin Console

Overview

The Admin Console enables you to create deployments, connectors and remote workstations all within a single console and from a single interface (UI). You can track all these components from the interface of the console, as well as monitor and manage all aspects of your deployment infrastructure. You can access support, release notes and get service status information from the Admin Console also. The Admin Console works with both Anyware Manager, and Anyware Manager as a Service.

The diagram below outlines a connection workflow for a cloud deployment using the Admin Console with Anyware Manager as a Service.



Connecting to the Admin Console

The following section outlines how to access and connect to the Admin Console for Anyware Manager, and Anyware Manager as a Service.

Connecting to Anyware Manager

Once you have unlocked the Admin Console, open a web browser and go to <https://public-or-private-ip-address-of-cas-manager> to login with the default "adminUser". If you have configured [multi-admin support](#), login with your enterprise identity provider account that has the required admin permission for Anyware Manager.

Connecting to Anyware Manager as a Service

Go to the [Admin Console login page](#) and log in with your Enterprise Microsoft Azure account, or if you are logging in through Google, a G Suite or Cloud Identity account. Enter your credentials to access the Admin Console.

Email Account Support with Anyware Manager

Anyware Manager supports two types of email accounts:

- Company email accounts registered with [Google G Suite](#).
- Company email accounts registered with [Microsoft Azure Active Directory services](#). For more information on this account type, see [Microsoft Azure Active Directory Authentication](#).

Personal Gmail accounts are not supported by default and need to be approved by HP before being used. For access to Anyware Manager with a personal Gmail account, contact [HP support](#). Anyware Manager as a Service does not support Microsoft personal email accounts.



CAS Manager

CAS Manager enables highly-scalable and cost-effective Cloud Access Software deployments. It simplifies and automates deployments of Cloud Access Software, monitors usage and cost of the cloud, and brokers and manages remote workstations, all from a single console. Sign in using an Enterprise Microsoft Azure account, Google G Suite or Cloud Identity account, or your organization's single-sign-on.

This application uses cookies. Read our privacy policy [here](#).

 Sign in with Microsoft

Microsoft personal accounts are not supported.

 Sign in with Google

To sign in with a Gmail personal account, [contact Technical Support](#).

If you encounter issues logging into the Admin Console, it could be for one of the following reasons:

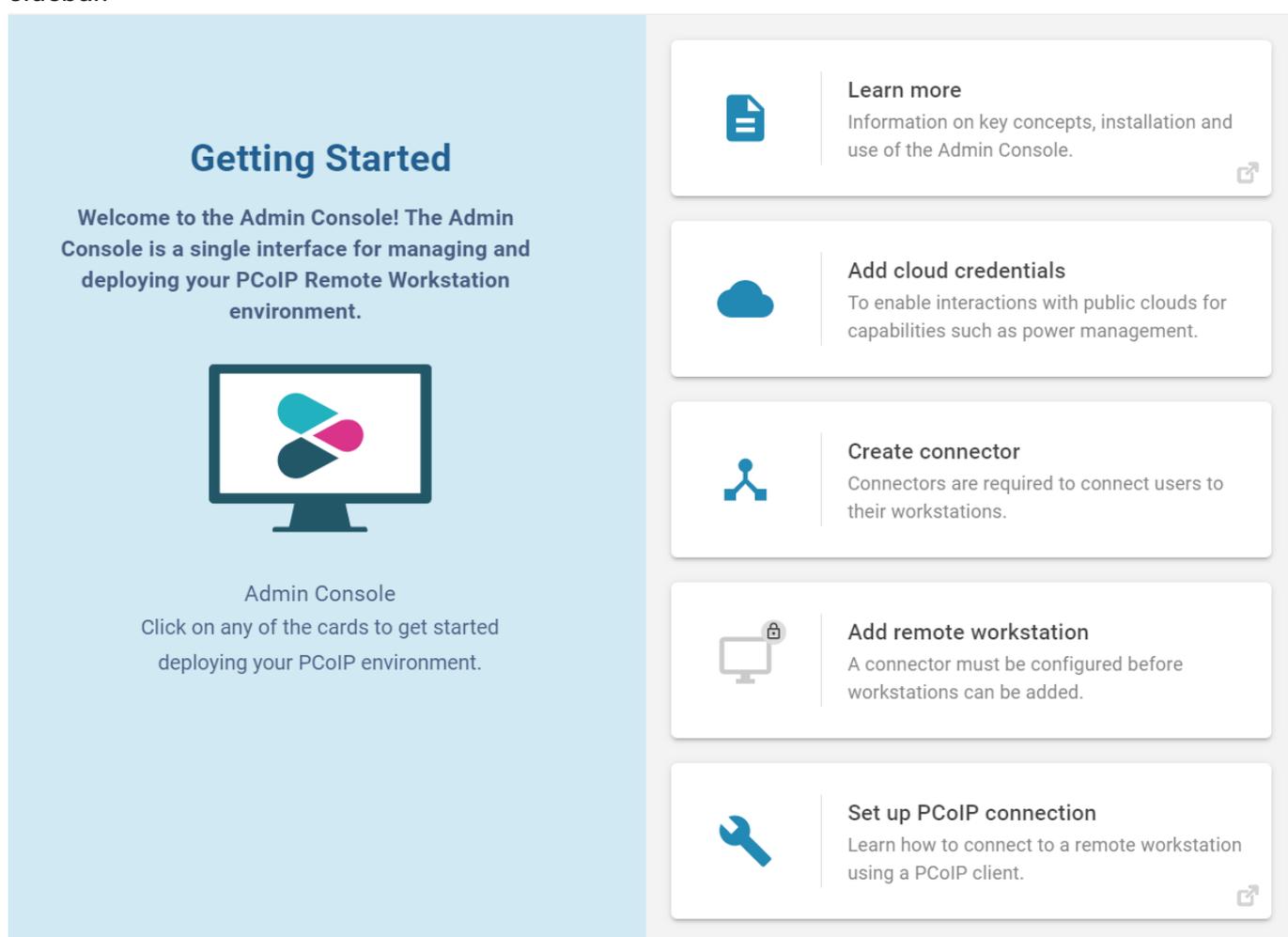
- The account being used is a personal account and has not been approved by HP.
- Cookies have been blocked on <https://cam.teradici.com/>.
- Pop-ups have been blocked on <https://cam.teradici.com/>.

If you continue to experience issues logging into the Admin Console, contact [HP Support](#).

Admin Console Dashboard

Once you log into the Admin Console you will see the dashboard page. This dashboard acts as a quick-start guide which points to where you can create deployments, create Connectors, add remote workstations as well as provide links to useful information within the Anyware Manager documentation.

You can return to the dashboard page at any time by clicking the **Dashboard** option from the console sidebar.



The screenshot displays the Admin Console Dashboard. On the left, a light blue panel titled "Getting Started" contains a welcome message: "Welcome to the Admin Console! The Admin Console is a single interface for managing and deploying your PCoIP Remote Workstation environment." Below the text is an icon of a monitor displaying the Anyware logo. Underneath the icon, it says "Admin Console" and "Click on any of the cards to get started deploying your PCoIP environment." To the right of this panel is a vertical stack of five white cards, each with an icon and a title:

- Learn more**: Information on key concepts, installation and use of the Admin Console. (Icon: document)
- Add cloud credentials**: To enable interactions with public clouds for capabilities such as power management. (Icon: cloud)
- Create connector**: Connectors are required to connect users to their workstations. (Icon: network diagram)
- Add remote workstation**: A connector must be configured before workstations can be added. (Icon: monitor with lock)
- Set up PCoIP connection**: Learn how to connect to a remote workstation using a PCoIP client. (Icon: wrench)

Configuring the Admin Console

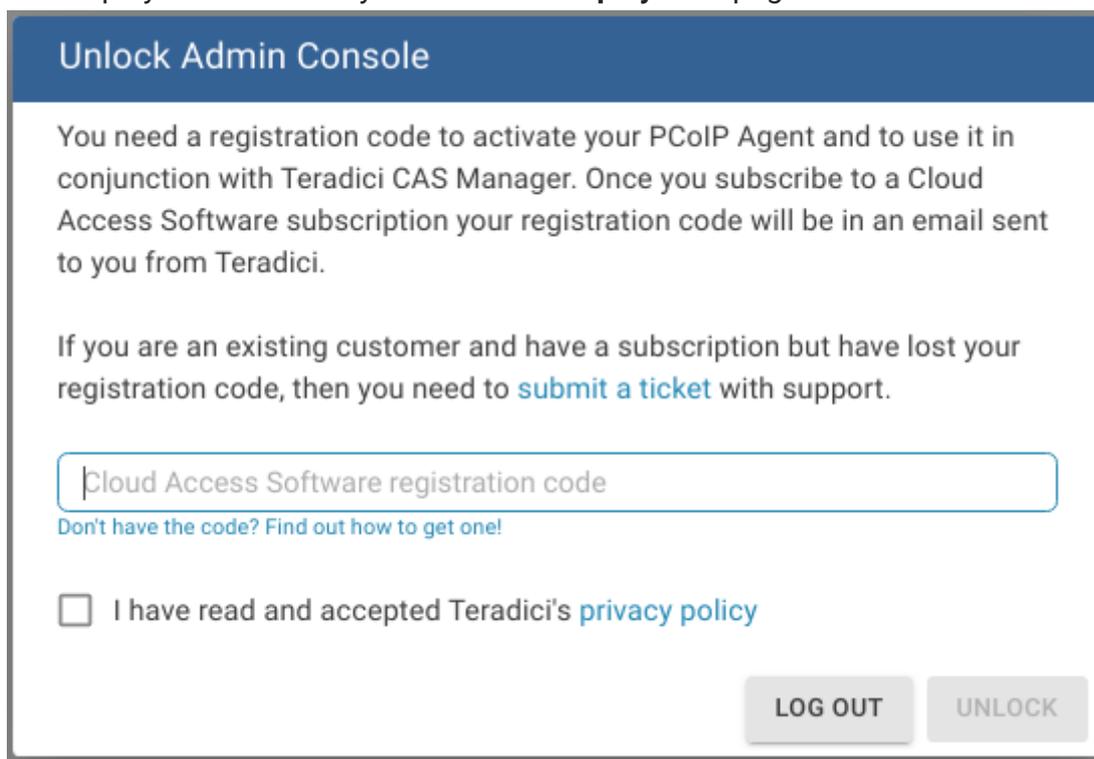
On the **Deployments**, **Connectors** and **Remote Workstations** pages you can control which columns are visible and in which order they appear for the listed resources. To change your column options,

select **COLUMNS** from the page heading and select which columns you wish to make visible. The format you select will be preserved when you log back into the Admin Console.

Managing Deployments

The following section outlines how to create a deployment using the Admin console:

1. If you do not have any existing deployments (first time log-in) you will be prompted to enter your Anyware Software registration code. Once you enter the code it will automatically generate your first deployment and take you to the **Edit Deployment** page.



Unlock Admin Console

You need a registration code to activate your PCoIP Agent and to use it in conjunction with Teradici CAS Manager. Once you subscribe to a Cloud Access Software subscription your registration code will be in an email sent to you from Teradici.

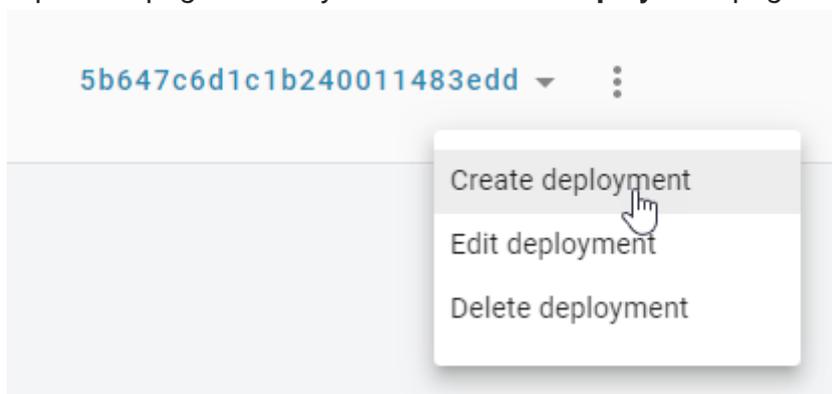
If you are an existing customer and have a subscription but have lost your registration code, then you need to [submit a ticket](#) with support.

[Don't have the code? Find out how to get one!](#)

I have read and accepted Teradici's [privacy policy](#)

LOG OUT UNLOCK

2. If you have existing deployments you can click **Create deployment** from the kebab options at the top of the page to take you to the **Create Deployment** page.



3. Enter the following information:

- Enter the deployment name.
- Enter your PCoIP registration code. Please store this code in a secure location as it cannot be retrieved later.
- Click **CREATE**.

The deployment has now been created and you can edit the deployment by configuring deployment service accounts, cloud service accounts and Connector settings.

Cloud Service Accounts

You can now enter cloud service account credentials for AWS, Azure and GCP if you are working in those environments and want to enable Anyware Manager to perform certain functions, such as power management. If you are not using AWS, Azure, and GCP then you do not need to enter this information.

Cloud Service Account Credentials

These credentials are used in places where the Anyware Manager as a Service interacts with your cloud environment to perform actions such as powering a remote workstation on or off. If credentials are not provided, remote workstations in that cloud can still be added to Anyware Manager as a Service and users can still be entitled to the remote workstation and start a PCoIP session, but Anyware Manager as a Service cannot perform functions such as power on and off.

Entering these credentials is optional and enables you to access extra functionality and control over the remote workstations within the deployment on the cloud provider of your choice.

Domain Controllers in a Single Deployment

You cannot deploy multiple Connectors against different Domain Controllers within the same deployment. This will cause the Connectors to crash.

AWS Cloud Credentials

The following sections outline how to managed and configure AWS cloud information for Anyware Manager and Anyware Manager as a Service. Please note the permissions required for Anyware Manager as a Service are different to the permissions for Anyware Manager.

AWS CLOUD CREDENTIALS FOR ANYWARE MANAGER

To configure AWS Cloud Credentials for Anyware Manager, see the [AWS Configuration](#) section.

AWS CLOUD CREDENTIALS FOR ANYWARE MANAGER AS A SERVICE

Through the Admin Console you can generate a Anyware Manager Account ID and External ID that can be used when creating an AWS role through the AWS Management Console. The following steps outline how to generate a Anyware Manager Account ID and External ID:

1. In the Admin Console select the deployment you wish to use.
2. Click **Edit Deployment**.
3. Click **Cloud Service Accounts**.
4. Select AWS and click **Generate**. Ensure you copy the Anyware Manager Account ID and External ID and save them to your clipboard.

AWS Role Creation and Permission Policy

You must create a role in your AWS account which Anyware Manager as a Service is able to assume. You must use the Account ID and External IDs when creating the AWS role. For more information on creating roles in AWS, see [here](#).

Once you have entered the Anyware Manager Account ID and External ID and created the AWS role, you will need to create a permissions policy for Anyware Manager as a Service that contains the following permissions:

- **Service:** EC2
- **Actions:**
 - List: DescribeInstances
 - Write: RebootInstances StartInstances StopInstances TerminateInstances

There are additional permissions needed to verify that the role has all the required permissions before being added to a deployment:

- **Service:** IAM
- **Actions:**
 - Read: GetUser SimulatePrincipalPolicy

The following is an example of how the permissions set should look in a JSON format:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "VisualEditor0",
      "Effect": "Allow",
      "Action": [
        "ec2:RebootInstances",
        "ec2:DescribeInstances",
        "ec2:TerminateInstances",
        "ec2:StartInstances",
        "ec2:StopInstances",
        "iam:GetUser",
        "iam:SimulatePrincipalPolicy"
      ],
      "Resource": "*"
    }
  ]
}
```

If the user tries to add an AWS role that doesn't have these permissions, Anyware Manager as a Service will still add the role but will not validate that it has the required permissions. You can now associate a permissions policy to this role.

1. Once you have created the role in AWS, copy and paste the role ARN and enter it into the Role ARN field in the Admin Console.
2. Click **Submit**.

For information on the AWS Service Account roles and permission policies with Anyware Manager as a Service, see [here](#).

Azure Cloud Credentials

For Azure you need to enter the Tenant ID, Subscription ID, Client ID and Client Secret.

For information on how to create a new Client Secret from Azure, see [here](#).

Azure Client Secret

Once you generate the client secret you need to copy it straight away as it will not be available again from Microsoft. If you have an expired client secret you need to delete it and then create a new secret and assign it to that deployment.

For information on the Azure Service Account and permission requirements with Anyware Manager, see [here](#).

GCP Cloud Credentials

You can enable GCP cloud credentials by entering the GCP client email, Project ID and Private Key and clicking **Submit**. You can also upload the JSON Key file with the GCP cloud credentials.

For more information on GCP Cloud Service Accounts with Anyware Manager, see [here](#).

Editing an Existing Deployment

The creation date, computer and users DNs and the interval time in minutes that it syncs with the Active Directory for the deployment are also displayed when you go to edit a specific deployment.

You can search for specific deployments by name by using the search bar in the table toolbar.

You can edit the deployment name, update the registration code and GCP or Azure cloud service account credentials of an existing deployment through the Admin Console. A menu item has been added to the table toolbar that enables you to create, edit, delete and view all existing deployments:

1. Click the dropdown menu from the top of the page and select the deployment.
2. Select the deployment and click the kebab option under the **ACTIONS** column to edit the deployment.
3. Update the deployment name, registration code, GCP or Azure credentials and then click **SAVE**.

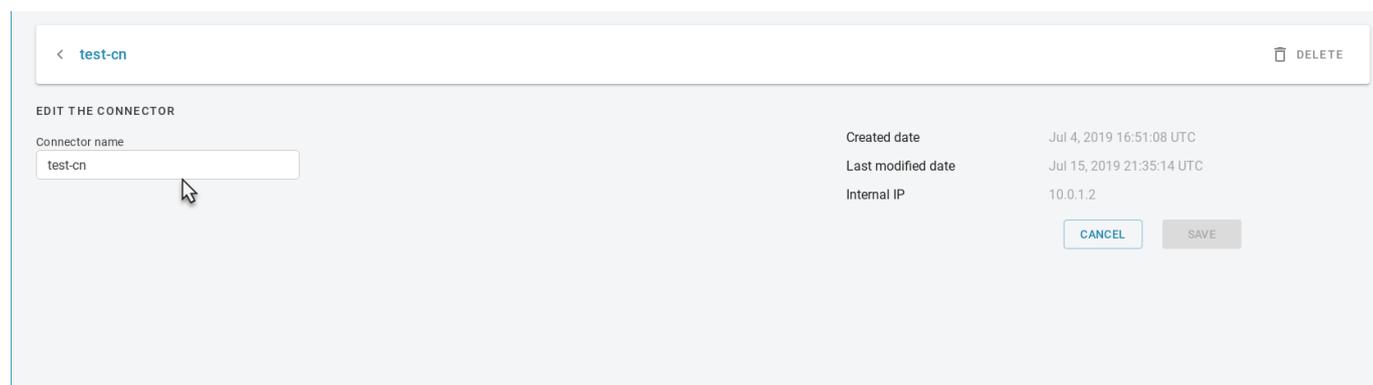
The updated information and credentials will now be associated with this deployment.

Editing a Anyware Connector

Once you have created a Connector you can edit its name by clicking on the Connector directly from the **Connectors** page or by clicking on **Edit** from the kebab associated with it on the **Connectors** page.

You can search for specific Connectors by name by using the search bar in the table toolbar.

Enter the new name and click **Save**.



The screenshot shows the 'EDIT THE CONNECTOR' form. At the top, there is a breadcrumb navigation bar with a back arrow and the text 'test-cn', and a 'DELETE' button with a trash icon. Below this, the form is titled 'EDIT THE CONNECTOR'. On the left, there is a 'Connector name' label and a text input field containing 'test-cn'. On the right, there is a table of metadata:

Created date	Jul 4, 2019 16:51:08 UTC
Last modified date	Jul 15, 2019 21:35:14 UTC
Internal IP	10.0.1.2

At the bottom right of the form, there are two buttons: 'CANCEL' and 'SAVE'.

Domain Controller Certificates

If all DC certificates have expired, the Anyware Connector will stop working. An error indicator will display on the **Connectors** page when a Anyware Connector has a DC with expired certificates.

A warning indicator that details the current state of the DC certs will display on the same page when a Anyware Connector has a certificate that less than a week away from expiring.

Anyware Connector - Troubleshooting

If there is an issue installing the Anyware Connector or an existing Connector is failing, please see the troubleshooting section on [Anyware Connector Connectivity](#). Within this section there are steps to check the following:

- Remote Workstation connections
- Active Directory connections
- Anyware Connector component information

You can also view the following KB article [here](#) which provides a list of troubleshooting steps for common issues related to installing the Connector. For information on installer errors related to a change in the distribution system, see [Installer Issues](#).

Provisioning a Remote Workstation

The following section outlines how to provision a remote workstation using the Admin Console.

Pre-Defined Images and Templates

If you wish to use your own custom images or templates, you must create and manage those outside of Anyware Manager and create your remote workstation outside of Anyware Manager also. Once you have created a remote workstation you can add it to your deployment in Anyware Manager for brokering and management.

Before provisioning a remote workstation you need to ensure that the Active Directory domain is correctly configured. This should be a different AD Service Account to the account used when installing the Connector. The AD Service Account needs to have the following permissions:

- Create Computer Objects
- Delete Computer Objects

The permissions on the Computer Objects must be set to:

- Read All Properties
- Write All Properties
- Read Permissions
- Modify Permissions
- Change Passwords
- Reset User Passwords
- Validated write to DNS host name
- Validate write to service principal name

These permissions are required so that the remote workstations are able to join the domain account. Without these permissions the remote workstation will still be provisioned, but there will be an issue when adding it to the domain.

Permissions to Create and Delete Computer Objects

The following section outlines how to add permissions to create and delete computer objects through the OU permissions dialog:

1. Go to the security tab of the OU you want to give permissions to.
2. Right-click the relevant OU and click **Properties**.
3. Go to the security tab and click **Advanced**.
4. Click **Add** and browse to your user account. As stated above you need to add the user account to the OU.
5. Select **This object and all descendant objects** and select the following permissions:
 - Create Computer Objects
 - Delete Computer Objects
6. Click **OK**.

Permissions on the Computer Objects

The following section outlines how to select permissions on the computer objects through the OU permissions dialog:

1. Go to the security tab of the OU you want to give permissions to.
2. Right-click the relevant OU and click **Properties**.
3. Go to the security tab and click **Advanced**.
4. Click **Add** and browse to your user account. As stated above you need to add the user account to the OU.
5. Limit the **Apply Onto** scope to **Descendant Computer objects** and select the following settings:
 - Read All Properties
 - Write All Properties
 - Read Permissions
 - Modify Permissions
 - Validated write to DNS host name
 - Validated write to service principal name
6. Click **OK**.

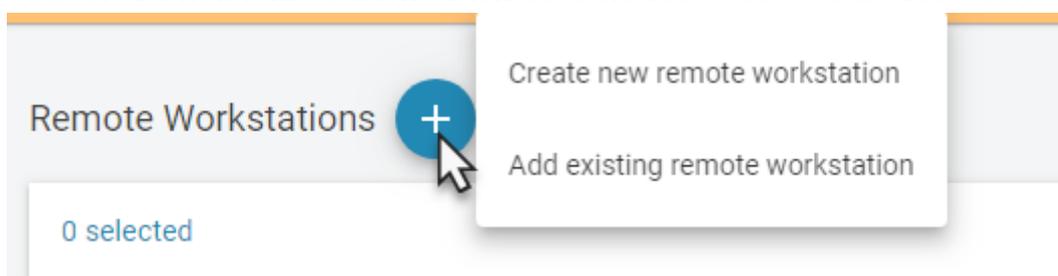
The validated write to DNS host and service principal name permissions are required so that the DNS record for a remote workstation can be created after it is domain joined.

For information on which Cloud Service accounts can perform certain features, please consult the [Service Account Requirements](#) section.

Provisioning a Remote Workstation

You must have a valid cloud service account to enable this feature. The following steps outline how to provision a remote workstation:

1. Click **Workstations** from the Admin Console sidebar.
2. Click **Create new remote workstation** from the add remote workstation icon.



3. Select an existing Connector from the dropdown menu.
4. Select a provisioning template from the dropdown menu and give your remote workstation a machine name. You can also choose whether you want to enable an automatic restart of the workstation. Compute engine can automatically restart remote workstation instances if they are terminated for non- user initiated reasons, such as maintenance events, hardware failures, software failures, etc.

5. Enter the remote workstations network, region and disk properties. An example of what this information may look like is shown below:

Remote Workstations > Create Remote Workstation

SELECT A CONNECTOR

Connector
test-cn

DEFINE THE WORKSTATION

Workstation provisioning template
CentOS 7.5 Graphics Agent - 20190731...

Machine name
new-machine

Automatic restart
 Automatically restart this machine

MACHINE PROPERTIES

Region
us-west2

Zone
us-west2-b

Network
aben-vpc-dc

Subnetwork
aben-subnet-cac - 10.0.1.0/24

Machine type
n1-highmem-64

GPU type
NVIDIA Tesla P4

Number of GPUs
1

Disk type
SSD Persistent Disk

Disk size (GB)
50

When deleting this machine
 Also delete this boot disk

⚠ Public IP or Cloud NAT Requirement

Provisioning will fail unless the machine has a public IP or Cloud NAT.

⚠ Remote Workstation Machine Name

Due to NetBIOS and a Windows limitation, the remote workstations machine name must be 15 characters or less. Failure to do this may result in issues with your remote workstation connection.

6. Enter the Active Directory information for the remote workstation. The service account must have permission to join computers to the domain.
7. Once you have entered all required information, click **CREATE**.

The remote workstation will now appear in the table of available machines on the **Workstations** page.

Active Directory Information

Active Directory information is only used during provisioning to join the remote workstation in question to the domain. This information is not saved by the Anyware Manager. The remote workstation is joined to the active directory domain configured in the Connector.

Metadata Retrieval and Storage Information

All provisioned remote workstations have `--metadata enable-guest-attributes=TRUE` set. This is set to facilitate the passing of data at provisioning time. For more information, see <https://cloud.google.com/compute/docs/storing-retrieving-metadata>.

IdleShutDown Agent Configuration

IdleShutDown Agent is configured so that the remote workstation will shutdown when it is idle. For more information on installing and configuring this feature, see [Configuring Idle Shutdown](#).

Workstation Pools

Creating Workstation Pools

You can create workstation pools within the Anyware Manager Admin Console. A workstation pool is a group of remote workstations. To simplify user access management, a user group or individual users can simply be assigned to a workstation pool.

A floating pool is a remote workstation pool that uses a **floating workstation assignment policy**. With this pool, a user is entitled to a pool and its remote workstations rather than a single remote workstation. When a user is assigned a remote workstation, this assignment is ephemeral. Once the user disconnects from the remote workstation there is a holding time where it will still be assigned to that user. This holding time can be configured by an admin user. Once this holding period expires, the user is unassigned to the remote workstation and it is added back to the pool and is available for re-assignment.

Once you log in to the Anyware Manager Admin Console, you are automatically assigned a remote workstation within the pool, depending on the assignment policy of the pool. When creating a remote workstation pool, the assignment policy can be selected.

Use Cases for Floating Workstation Assignment Policy

The following section outlines potential use cases for the floating workstation assignment policy:

Two user's and two Windows workstations

- User 1 attempts to log in with a PCoIP Client.
- Windows workstation 1 is successfully assigned to User 1.
- User 2 attempts to log in with a PCoIP Client.
- Windows workstation 2 is successfully assigned to User 2.

Two user's and a single Windows workstation

- User 1 attempts to log in with a PCoIP Client.
- Windows workstation 1 is successfully assigned to User 1.

- User 1 closes the PCoIP Client.
- User 2 then attempts to log in and is presented with an error message stating "Resource does not exist in CAM Service".
- User 2 attempts to log in 25 minutes later. The assignment holding time for this example is 20 minutes, which is the default minimum assignment holding.
- Windows workstation 1 is successfully assigned to User 2. The Windows session is taken over by User 2.

These use cases also apply for RHEL/CentOS workstations.

The following section outlines how to create a floating workstation pool from the Anyware Manager Admin Console:

Creating a Workstation Pool

You can add multiple workstation pools to specific deployments. Each workstation pool will list the remote workstations, users and user groups within that pool. The following steps outline how to create a workstation pool, and choose the floating pool assignment policy:

1. Click on **Workstation Pools** from the Anyware Manager Admin Console sidebar.
2. Click the **+** icon to create a new workstation pool.
3. Name the pool and choose the **Floating** option for the workstation assignment policy. The workstation assignment policy determines how workstations belonging to the workstation pool are assigned to users when they log in. This assignment policy can not be modified after the workstation pool has been created.
4. Enable **Session Tracking** by selecting the toggle.
5. Add the workstation holding time in minutes. Once this holding period expires, the user is unassigned to the remote workstation and it is added back to the pool and is available for re-assignment.
6. Name the pool and click **CREATE**.

There are two possible options for the workstation assignment policy:

Persistent: This is the default policy. Once a user logs in they are automatically and persistently assigned a remote workstation within the pool.

Floating: With the floating policy, once a user disconnects their PCoIP session, the remote workstation will be automatically unassigned from the user, and the remote workstation will become available for other users to connect to.

Adding Remote Workstations to a Workstation Pool

Remote workstations and users within a workstation pool are a subset of the available remote workstations and users within a specific deployment. As a result of this, you will only be able to add remote workstations and users that have already been created in Anyware Manager. The following steps outline how to add remote workstations to a workstation pool:

1. Click on **Workstation Pools** from the Anyware Manager Admin Console sidebar.
2. Select the workstation pool you created in the previous section to display the edit pools page.
3. Click **Add Remote Workstations** and add remote workstations to the pool.

Adding Users to a Workstation Pool

Only specified users can establish PCoIP sessions to remote workstations in the workstation pool. If a remote workstation is available (not assigned to a user) it will be automatically assigned to the user. The following steps outline how to add users to a workstation pool:

1. Select the workstation pool and click **Add Users/Add Groups**.
2. Search for the users you want to add, select them and click **SAVE**.

Once users and remote workstations are added to the workstation pool, users from the workstation pool get available workstations upon log in. Once the PCoIP Session is disconnected, the remote workstation will become automatically available for future connections or continue to be assigned to the user depending on the workstation pool assignment policy.

Features and Known Limitations

There are certain limitations associated with this feature, as outlined in the following list:

- This feature is only supported in Connector(s) version 78 or higher.
- If all remote workstations have been assigned, and no remote workstations are available, users will see the following error during session establishment "Resource does not exist on CAM Service".

- Remote workstations will remain assigned to a user for approximately 20 minutes after the PCoIP session has been disconnected by default. This time period is configurable through assignment holding time, and has to be longer than 20 minutes.
- The current limit is 200 remote workstations in a floating pool. The feature will work with a larger number of remote workstations, but the assignment timing may vary.
- **Limited support for Linux Agents:** When establishing a PCoIP session to Linux Agents, the session must be logged off before another user can connect. If the session is not logged off, the user will see a 6604 error message. To resolve this error reboot the remote workstation. This issue is being worked on.
- When connecting to a PCoIP Agent for Windows, if a previous user has been connected, the other user will see the Windows Switch Users screen. They will then be prompted to enter their credentials again before accessing the desktop.
- For Windows remote workstations that are power managed through Anyware Manager, the Idle Shutdown Service for the PCoIP Agent can be installed and configured. Once this service is installed, the remote workstation will automatically power off after the PCoIP session has been disconnected. During PCoIP session establishment, the remote workstation will be powered on. For information on installing and configuring the Idle Shutdown Service, see [below](#).

Idle Shutdown Service

The following section outlines the steps to install and configure the Idle Shutdown Service for each Windows remote workstation:

1. Connect to the remote workstation via the PCoIP Client. Ensure you have admin permissions.

2. Copy the following PowerShell script:

```

$idleTimerRegKeyValue = <idle-time-in-minutes>
$enableAutoShutdown = <$true-or-$false>

# Detect agent type
$is64 = $false
$serviceName = "CAMIdleShutdown"
$path = "C:\Program Files (x86)\Teradici\PCoIP Agent\bin"
if (!(Test-Path -path $path)) {
    $path = "C:\Program Files\Teradici\PCoIP Agent\bin"
    $is64 = $true
}
cd $path

# Install Service
$ret = .\IdleShutdownAgent.exe -install
# Check for success
if( !$? ) {
    $msg = "Failed to install {0} because: {1}" -f $serviceName, $ret
    Write-Host $msg
    throw $msg
}

# Configure Service
$idleTimerRegKeyPath =
"HKLM:\SOFTWARE\WOW6432Node\Teradici\CAMShutdownIdleMachineAgent"
if ($is64) {
    $idleTimerRegKeyPath =
"HKLM:\SOFTWARE\Teradici\CAMShutdownIdleMachineAgent"
}
$idleTimerRegKeyName = "MinutesIdleBeforeShutdown"
if (!(Test-Path $idleTimerRegKeyPath)) {
    New-Item -Path $idleTimerRegKeyPath -Force
}
New-ItemProperty -Path $idleTimerRegKeyPath -Name $idleTimerRegKeyName -
Value $idleTimerRegKeyValue -PropertyType DWORD -Force

# Disable service if desired
$svc = Get-Service -Name $serviceName
if (!$enableAutoShutdown) {
    $msg = "Attempting to disable {0} service" -f $serviceName
    Write-Host $msg
    try {
        if ($svc.Status -ne "Stopped") {
            Start-Sleep -s 15
            $svc.Stop()
            $svc.WaitForStatus("Stopped", 180)
        }
    }
    Set-Service -InputObject $svc -StartupType "Disabled"
}

```

```
$status = if ($?) { "succeeded" } else { "failed" }
$msg = "Disabling {0} service {1}" -f $svc.ServiceName, $status
Write-Host $msg
}
catch {
    throw "Failed to disable CAMIdleShutdown service."
}
}
```

If the remote workstation was provisioned by Anyware Manager then the `idle timer` is already configured. In this case the `Install Service` section of the above commands can be skipped.

3. Set `$idleTimerRegKeyValue` to be between 5 and 10000, this is the number of minutes before the remote workstation is considered idle after the last PCoIP session was disconnected.
4. Set `$enableAutoShutdown` to `$true`.
5. Save the PowerShell script with a `.ps1` file extension and run the script. After the script has been successfully executed, the idle shutdown timer should be running. The remote workstation will now shutdown after the specified number of minutes of inactivity, as configured in step 3, once the user disconnects.

For more information on the Idle Service Shutdown, see [Installing and Configuring Anyware Manager as a Service](#) in the Anyware Manager as a Service guide.

Auto Log-Off Service

When a user disconnects their PCoIP session from a Linux PCoIP Agent, a different user is unable to connect unless the existing remote workstation user session is terminated. This will result in the remote workstation being locked, and unusable in a floating pool assignment, since a different user cannot log-in.

The auto log-off service enables you to bypass this issue by terminating a user session after the PCoIP session has been terminated. The auto log-off service monitors the **pcqip-server** process every minute. If it is not an active process then it samples the CPU load involved and if it is below a certain level for a certain amount of minutes, the script terminates the **pcqip-desktop-child** process which emulates a user logging off.

The auto log-off service disconnects a user if following criteria are met:

- No active PCoIP session detected (**pcqip-server** process is terminated).
- CPU utilization is less than 20% (`CPUUtilizationLimit`) for over 20 minutes (`MinutesIdleBeforeLogOff`).

- Sampling rate is 1 minute (`OnUnitActiveSec`).

INSTALLING AND CONFIGURING THE AUTO LOG-OFF SERVICE

You must have a CentOS/RHEL 7.8 virtual machine or Ubuntu virtual machine installed in order to run this service.

CentOS/RHEL Virtual Machine

- Run the following command to install the `pcoip-agent-autologoff` service on a CentOS/RHEL virtual machine:

```
sudo yum install pcoip-agent-autologoff
```

Ubuntu Virtual Machine

- Run the following command to install the `pcoip-agent-autologoff` service on a Ubuntu virtual machine:

```
sudo apt-get install pcoip-agent-autologoff
```

Once you have installed the service you can manage it via the `pcoip-agent-autologoff-mgmt` script. This script is located in `/opt/teradici/pcoip-agent-autologoff/pcoip-agent-autologoff-mgmt`. The following commands must be executed either from the script path, or using the full path of the script.

The following table outlines the options you can use to manage the auto log-off service:

Option	Description
<code>--enable</code>	Enable the service.
<code>--disable</code>	Disable the service.
<code>--change-params</code>	Modify CPU utilization limit (CPUUtilizationLimit) and Idle time before logging off (MinutesIdleBeforeLogOff).
<code>--change-timer</code>	Modify polling interval (OnUnitActiveSec). This value sets how often the service runs.
<code>--show-logs</code>	Shows last 100 log messages.
<code>--follow-logs</code>	Shows live log messages.
<code>--help</code>	Shows the tool help page.

The default settings are shown in the table below. It is possible to modify these settings after the auto log-off service has been installed and configured:

Setting	Default	Description
<code>MinutesIdleBeforeLogOff</code>	20 minutes	Number of minutes the remote workstation must be considered idle before it logs a user off. The timer only starts when a user is not in PCoIP session.
<code>CPUUtilizationLimit</code>	20%	Value between 0 and 100 representing CPU utilization percentage. If average CPU utilization is below this value, the machine is considered idle, and will log-off if maintained for <code>MinutesIdleBeforeLogOff</code> .
<code>OnUnitActiveSec</code>	1 Minute	Polling interval in minutes for checking the CPU utilization.

ENABLING THE AUTO LOG-OFF SERVICE

The following section outlines how to enable the auto log-off service.

1. To enable the service run the following command:

```
sudo pcoip-agent-autologoff-mgmt --enable
```

2. To disable the service run the following command:

```
sudo pcoip-agent-autologoff-mgmt --disable
```

UPDATING THE AUTO LOG-OFF SERVICE CONFIGURATION

The following section outlines how to update the auto log-off service configuration.

- Run the following command to change `MinutesIdleBeforeLogOff` or `CPUUtilizationLimit`:

```
sudo pcoip-agent-autologoff-mgmt --change-params  
  
# follow the prompt to apply changes to the service
```

- Run the following command to change `OnUnitActiveSec`:

```
sudo pcoip-agent-autologoff-mgmt --change-timer  
  
# follow the prompt to apply changes to the service
```

- Run the following command to show the log history:

```
sudo pcoip-agent-autologoff-mgmt --show-logs
```

- Run the following command to follow the logs:

```
sudo pcoip-agent-autologoff-mgmt --follow-logs
```

- Run the following command to display help information:

```
sudo pcoip-agent-autologoff-mgmt --help
```

Floating Workstation Assignments

Floating workstation assignments is a feature of the Connector v78 or higher, which enables a user's entitlement to a workstation to be temporary. The remote workstation can be used by multiple users. Floating workstation assignments enables remote workstations that are part of a Remote Workstation Pool, to be assigned to a user for the duration of the PCoIP session. Once this session has been disconnected, the remote workstation will be automatically unassigned, and will be available for other users to connect.

This feature is useful for managing persistent remote workstations that are shared by multiple users and that have expensive software and applications, such as video editing, video proofing, etc. Multiple users can access the same remote workstation and utilize these applications. It can be used for project based remote workstations, where remote workstations are associated with projects instead of users. Teams can log into the project and access a specific remote workstation for that project. This also enables organizations to enforce logical separation of remote workstations.

The following sections outlines the steps involved in enabling this feature.

Create a Floating Pool

The next step is to create a floating pool group from the Admin Console.

1. Open the **Workstations Pools** page and click the **+** icon to create a new pool.
2. Select **Floating** for the workstation assignment policy, name the pool and click **CREATE**.
3. Click on the newly created pool from the Pools menu.
4. Click **ADD REMOTE WORKSTATIONS** to add workstations to the pool and click **SAVE**.

Remote Workstation Limit

There is a limit of 200 remote workstations in a floating pool. This feature will work with a larger number of remote workstations, but assignment timing may vary as a result.

Assign Users to the Pool

Once you have enabled session tracking and created and added remote workstations to your pool, you now need to add specific users. Only specified users can establish PCoIP sessions to remote workstations in the pool.

1. Click on the newly created pool from the Pools menu.
2. Click **ADD USERS** from the top menu, select the users you want to add and click **SAVE**.

Once you have completed these steps any user from the pool will be able to get any available remote workstation from the same pool on login. Once the PCoIP session has been disconnected, the remote workstation will automatically become available for future connections.

Session Disconnection

Please note that remote workstations will remain assigned to a user for **approximately 25 minutes** after the PCoIP session has been disconnected.

Limited Support for PCoIP Agents for Linux

PCoIP sessions to PCoIP Agents for Linux must be logged off before another user can connect. If the session is not logged off, the user will see a 6604 Error. If you observe this error, reboot the remote workstation.

Workstation Profiles

Workstation profiles logically group remote workstation provisioning information. Profiles define a set of workstation deployment settings that will be shared by any workstation deployed from this profile. This feature enables administrators to streamline deploying workstations and improves the experience of deploying a large number of identical remote workstations.

Creating a Workstation Profile

The following steps outlines how to create a workstation profile from the Admin Console. Once you have created a workstation profile, you can use it to deploy a remote workstation.

1. Click on **Workstation Profiles** from the Admin Console sidebar.
2. Click the **+** icon to create a new workstation profile.
3. Enter a unique name for the workstation profile.
4. Select the cloud provider you wish to use. Currently Azure and GCP are supported.
5. Select a remote workstation template. The remote workstation template defines the base OS and provisioning steps for the remote workstation you will deploy. The only required field is the **Resource template ID** parameter.

Create a new workstation profile

WORKSTATION PROFILE NAME
Unique name for the workstation profile

SELECT PROVIDER
Provider

▲ Azure

WORKSTATION TEMPLATE
Select a remote workstation template

CentOS 7 Standard Agent - 20210701010219

PROVIDER PROPERTIES (optional)
Select the location of the remote workstation

Central US

Azure resource group

BLJBackupRSV (centralus)

Azure Virtual Network

Select virtual network

Machine Subnet

Virtual network required

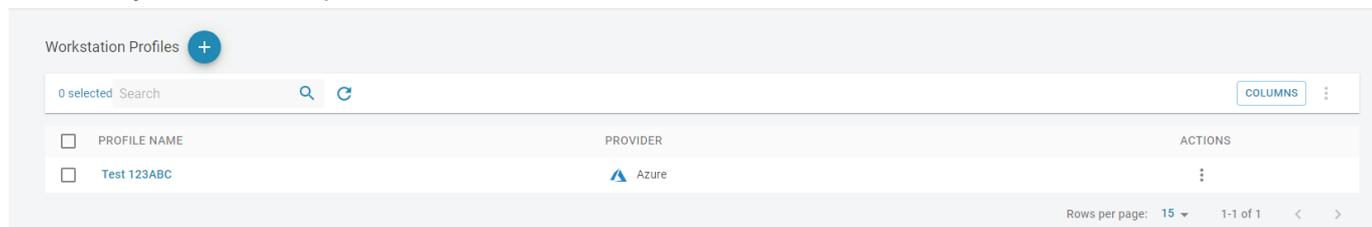
WORKSTATION PROPERTIES (optional)
Select the size of the machine

Standard_A2 (2 vCPUs - 3.5 GB)

CANCEL
CREATE

6. Once you entered all the required information, click **CREATE**.

The workstation profile you created will now be visible in the list of workstation profiles. You can delete any workstation profiles from this view.

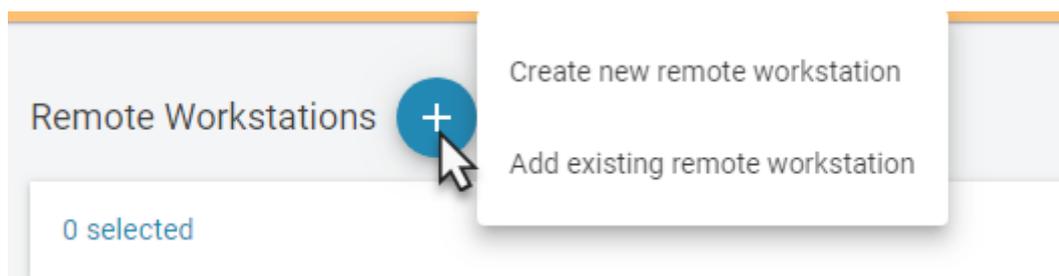


PROFILE NAME	PROVIDER	ACTIONS
Test 123ABC	Azure	

Deploying a Remote Workstation with a Workstation Profile

Once you have created a workstation profile you can use it to populate the **Create Workstation** page. The following steps outline how to use the workstation profile when creating a new remote workstation:

1. Click **Workstations** from the Admin Console sidebar.
2. Click **Create new remote workstation** from the add remote workstation icon.



3. Select the cloud provider you wish to use. This must be the same cloud provider you entered when you created the workstation profile.
4. From the **WORKSTATION PROFILE** tab select the workstation profile you created to auto-fill the page with the provider properties, workstation template and workstation properties.
5. If you chose Azure as your cloud provider, enter the remote workstation username and password.
6. Enter the Active Directory account and password. The Active Directory information is only used during provisioning to join the remote workstation to the domain. This information will not be saved by the Anyware Manager or Admin Console.
7. Click **DEPLOY**.

The remote workstation has now been created and deployed and will be visible on the **Workstations** page. Using a specific workstation profile ensures that the identical information is used for all remote workstations created.

 **Workstation profile checkbox**

If you deploy a remote workstation and do not use a workstation profile, you will be prompted by a message asking if you want to use this configuration as a workstation profile. You can select to not show this message again, but then you will not be prompted to create a workstation profile for future deployments.

Workstation Status in Anyware Manager

Anyware Manager helps you monitor the status and health of each Workstation available in your deployment. Each Workstation has a status that is affected by any errors detected by the Anyware Manager. If no errors are detected, the status column on the Workstations page for a specific Workstation will contain a green check mark. When errors are detected, the column displays a red warning icon. Clicking on the icon displays a list of the errors affecting the Workstation status. You can sort the status column by clicking on the column header to locate all Workstations with errors.

Types of Errors

Anyware Manager Errors

Anyware Manager Errors are detected internally and can affect the ability to connect to Workstations. They are depicted by the following icon:



System Errors

System Errors can be of two types and are issued by Intel® AMT. They are as follows:

- **System Boot:** Anyware Manager can detect initialization errors from Workstations that support AMT 9 or later.
- **Power Supply:** Anyware Manager can detect Power Supply errors for HP ZCentral 4R Workstations.

They are depicted by the following icon:



For more information, see [System Alerts](#) for more details.

SAML Configuration with Anyware Manager

What is SAML?

SAML stands for Security Assertion Markup Language (SAML) and is a standard which Identity Providers use to communicate authorization credentials to different Service Providers. This enables users to manage one set of credentials to authenticate with different services.

SAML enables federated login to several services by passing authorization credentials between services. A SAML flow has three main roles:

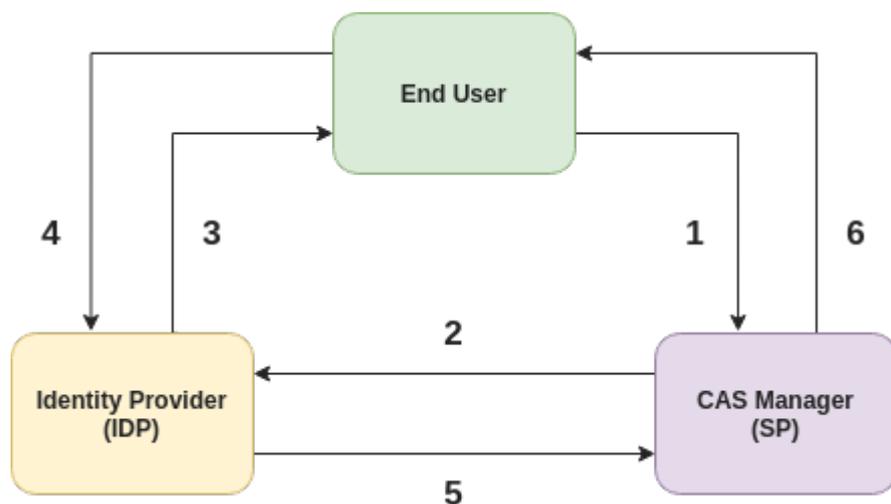
- **End User:** A user who is trying to access a service using federated login credentials
- **Identity Provider (IDP):** An identity provider performs the authentication about the end users identity and sends the necessary data to the service provider along with any other access control data in the form of **SAML Assertions**. Popular examples are Azure Active Directory and Okta.
- **Service Provider (SP):** A service provider is the system that requests authentication from an identity provider to authorize an end user. **Anyware Manager plays the role of a SP**

SAML Assertions

SAML Assertions are XML documents that the IDP sends to a given SP to validate user authorization. There are three different types of SAML Assertions:

- **Authentication:** This assertion provides user identity and the time at which a user was authenticated and the method of authentication that was used.
- **Attribute:** This assertion passes the SAML attributes about the user to the service provider. There can be more than one attribute assertions in a SAML response.
- **Authorization:** This assertion is the decision that determines if the user was successfully authorized to access the service or not by the IDP. Most common causes of failed authorization are incorrect password and/or insufficient access to the service the end user tried to access.

Anyware Manager Initiated SAML Authentication Flow



In the diagram above the following is happening

1. An end user wants to login to Anyware Manager. The user uses the SSO link for Anyware Manager.
2. Anyware Manager requests the configured IDP for the SAML response for the user.
3. IDP requests the user to login and verifies credentials.
4. User logs in with the desired credentials to IDP.
5. The IDP now sends a SAML response to Anyware Manager based on the user provided credentials.
6. Anyware Manager validates the SAML response and *SAML Attribute Assertions for Anyware Manager* received from the IDP, and then grants access to the end user.

SAML Attribute Assertions for Anyware Manager

Anyware Manager checks for the following attributes in the SAML response received from the configured IDP:

- **NameID:** Anyware Manager verifies the NameID attribute, which is used to uniquely identify a user. The NameID value is typically a user's UPN or email.
- **Group Attributes:** Anyware Manager can also verify a user's group membership from properties in the AttributeStatement of the SAML Assertion. The *Group attribute name* (configured in the *Allowed Groups* tab on the *Multi Admin Setting* page of the Admin Console) specifies the name of the Attribute where the groups are returned. The AttributeValue can match either a *Group ID* or *Group Name* based on how an Allowed Group was created in the Multi-Admin Settings page.

Anyware Manager will allow access to a user through a SAML configuration if the user is in the list of **Allowed Admins** in Anyware Manager or the user is a member of one or more of the **Allowed Groups** in your IDP. Hence if you need to revoke a user's access to Anyware Manager through a SAML configuration, you will need to remove the user from the **Allowed Admins** list in Anyware Manager and remove the user's membership from any **Allowed Groups** through your IDP.

Configure Anyware Manager as a SAML Service Provider to Enable Multi-Admin

The following section outlines the steps to setup and configure SAML for Anyware Manager using the Anyware Manager Admin Console:

1. From the account icon click **Multi Admin Settings** to create a new multi-admin configuration.
2. Register Anyware Manager as a SP with your IDP. You can obtain the **Assertion Consumer Service URL** and **Audience URL** from the **Configuration Info** section. This information should be used to configure your IDP to recognize Anyware Manager as a SP.
3. Configure Anyware Manager to be able to connect to your IDP. Obtain the **Identity Provider Login URL** and **Identity Provider Certificate** from your IDP and configure the **IDP Settings** section accordingly. Alternatively you can also upload an *IDP XML Metadata* file in the **IDP Settings** section.
4. Enable Multi-Admin configuration to use configured IDP. Make sure that your configuration is enabled by toggling the switch at the bottom of the **Configuration Info** section and confirm that you see the *Configuration is enabled* message.
5. Configure Anyware Manager Assertion Attributes:
 - To allow individual user as admin, go to the **Allowed Admins** section and add the UPN associated to that user. Anyware Manager validates the UPN against the **NameId** SAML assertion attribute in the SAML response received from the IDP.
 - To allow user groups. Go to the **Allowed Groups** section and configure the **Group Attributes** accordingly. This configures Anyware Manager to validate the **Group Name** and/or **Group ID** SAML attribute assertions in the SAML response received from the IDP.
 - You can configure either **Allowed Admins** or **Allowed Groups** or both in the **Multi-Admin Settings**.
6. Allowed users can now access Anyware Manager by opening the **Anyware Manager login page** URL which is available in the **Configuration Info** section. Alternatively, users can also directly login

via the IDP using the **Direct login via identity provider** URL also available on the **Configuration Info** section.

Configuration Information

This section contains auto-generated information about the login URLs and IDP:

- **Anyware Manager login page:** A link to the page for multi-administrator login to the Admin Console. This is the SSO link used by the end user in **Step 1** of SAML auth flow diagram
- **Direct login via identity provider:** An endpoint to which multi-admin sign-in requests can be sent. This is the login page for the configured IDP.
- **Assertion Consumer Service URL:** The callback URL provided to the IDP to which user information is sent once the IDP has authorized the user. This is the Anyware Manager endpoint that the IDP sends the SAML response to in **Step 5** of the SAML auth flow diagram
- **Audience URL:** The entity ID that the IDP can use to identify the Admin Console.

IDP Settings

This section contains IDP settings that can be updated to manage the SAML configuration within Anyware Manager:

- **Identity Provider Login URL:** The IDP endpoint to which SAML authentication requests are sent. This endpoint is the one that Anyware Manager sends the SAML login request to in **Step 2** of SAML authentication flow diagram above.
- **Identity Provider Certificate:** The public certificate of the IDP used to verify the signature of the IDP.

You can also upload a .xml file that contains your IDP information.

Allowed Admins

This section enables you to add new admins and displays all existing admins that are allowed to login via your IDP. To add a new admin, enter their e-mail, and click the **Add Admin** button.

Allowed Groups

This section enables you to add new groups and displays all existing groups that are allowed to login via your IDP. To enable the access for a group of users, enter the *claim type* and *group claim* and click **Add Group**.

- The *claim type* informs Anyware Manager how the group is returned in the SAML attribute assertions in the SAML response received from your IDP.
- The *group claim* matches against the group either in the **Group Name** claim or in the **Group ID** claim received in the SAML attribute assertions for a user based on the *claim type* defined for the group.

Service Account and API Access

Anyware Manager as a Service provides direct API access in the Anyware Manager as a Service service. APIs are an advanced way of interacting with the service, which enables you to integrate it into your business systems or to automate your use of the service for your specific needs.

HP Advantage Partner Program

To access and use the Anyware Manager as a Service APIs, you must be a member of the HP Advantage Partner Program (TAPP) or have been pre-approved by HP. Contact HP [here](#) for more information.

Service Accounts: There are two types of service accounts that you can create with the Admin Console:

Anyware Manager Service Accounts

The Anyware Manager service account is an account that is created from the Admin Console for the purpose of creating future deployments and deployment service accounts through the Anyware Manager as a Service APIs. The Anyware Manager service account cannot perform any actions within a deployment, and so further actions to a deployment require the deployment service account, which is outlined below. For information on creating a Anyware Manager service account, see [here](#).

Deployment Service Accounts

Deployment service accounts are specific accounts that can only perform actions against the deployment, such as adding remote workstations. The deployment in this case is the deployment the service account is created within. They cannot perform actions against any other deployment. For information on creating a deployment service account, see [here](#).

API Access Token

The API Access Token can be used to enable a user to operate at a level above deployments, such as creating a new deployment. The API Access Token is only valid for a limited period of time. This token also acts as an authorization token that can be used when performing an account ownership transfer, as outlined in the [Account Ownership section](#) of the Anyware Manager as a Service guide.

For more detailed information on accessing the Anyware Manager as a Service APIs, see <https://cam.teradici.com/api/docs>.

Creating a Anyware Manager Service Account

You can create a Anyware Manager service account from within the Admin Console. The following steps outline how to create a Anyware Manager service account.

1. Click on your account name and select **Anyware Manager service account**.
2. Click the **+** icon from the Anyware Manager service account page and name your new account.
3. Once you have created the Anyware Manager service account download the JSON file or copy the key id. Ensure that you store the file securely as this key cannot be recovered if lost.
4. Go to the [Service Account Keys](#) section of the Anyware Manager as a Service API documentation for the required APIs to use this key to create a deployment.

Creating and Assigning a Deployment Service Account

You can create and assign a deployment service account to a deployment through the **Deployments** option within the Anyware Manager as a Service Admin Console. The following steps outline how to add a deployment service account to an existing deployment:

1. Click on your deployment from the console dropdown to display your existing deployments.
2. Click the kebab icon and click **Edit deployment** to display the deployment properties page.
3. Under the **Deployment Service Accounts** tab click the **+** sign to create a service account.
4. Once the service account has been created it will return service account information. This information should be saved as a JSON file in a secure location, as it can only be retrieved once. It will return a Anyware Manager as a Service API token that you can use to query the Anyware Manager as a Service APIs. This token is only authorized to access resources associated to the deployment that service account is associated with.

All deployment service accounts associated with a specific deployment will be listed on the deployment page. You can delete deployment service accounts from this page. For information on using the deployment service accounts and deployment service keys with the Anyware Manager as a Service APIs, see [here](#).

Obtaining a Anyware Manager as a Service API Access Token

API access tokens permit you to enable other tools and applications to interact with Anyware Manager as a Service through public APIs. The access token has tenant level permissions, which enables you to access all of a user's resources from any deployment.

To obtain a Anyware Manager as a Service API Access token:

- Click **Get API token** from the user account icon within the Admin Console. You will receive the following message:

You need to copy the token as it will expire after a period of time.

HP Advantage Partner Program

To access and use the Anyware Manager as a Service APIs, you must be a member of the HP Advantage Partner Program (HPAA) or have been pre-approved by HP. Contact HP [here](#) for more information.

Remote Workstations

Adding a Remote Workstation

You can add an existing remote workstation you created within the Admin Console, or one created in your cloud environment to a deployment. You can also view and add available resource groups if the remote workstation has valid cloud credentials. The remote workstation must have a PCoIP Agent installed on it and be visible to the Connector. You must have a valid Anyware Software registration code and the remote workstation, and user, must be part of the deployments active directory domain. Any remote workstations that have a PCoIP Agent installed must be domain joined.

The following steps outlines how to add an existing remote workstation to your deployment using the Admin Console:

1. Click **Workstations** from the console sidebar.
2. Click the Add Remote Workstation button and click **Add existing remote workstation** to display the Add a Remote Workstation panel.
3. Select a Cloud Services Provider.
 - If your remote workstation has AWS credentials select the AWS region.
 - If your remote workstation has Azure credentials you can view and select available resource groups from the resource groups tab.
 - If your remote workstation has GCP credentials select the GCP region where your remote workstation resides, as well as the GCP zone.
 - If your remote workstation is on the Private Cloud you can search for, and add, these remote workstations. They must be domain joined and have a PCoIP Agent installed. If you want to add remote workstations that are not domain joined, you can click **DEFINE YOUR OWN MACHINES** and enter the name of the remote workstation and add it. The Connector can connect to this remote workstation by a FQDN or an IP address. If you are using an IP address, ensure it is static or persistently assigned to the remote workstation in question.
4. Select the remote workstations you want to add.
5. Select how you want to manage adding users to these remote workstations. You can individually select users, add users later or use workstations pools.

6. Click **SAVE**.

The remote workstation should now appear on the **Workstations** page.

Editing a Remote Workstation

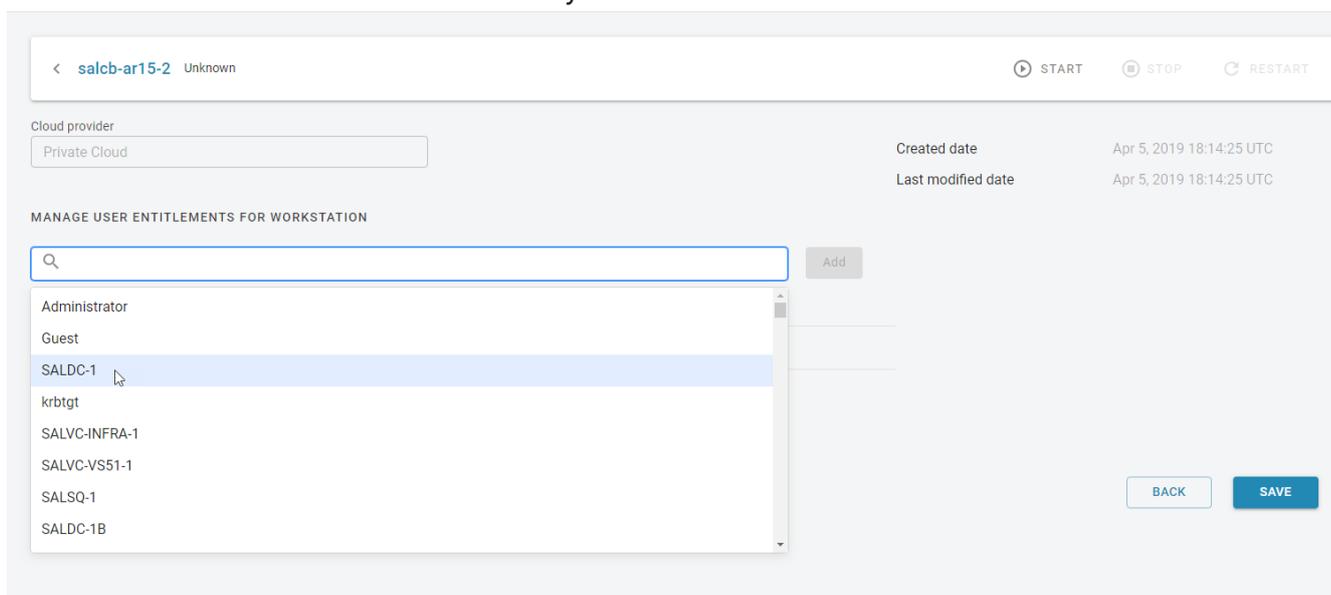
Once you have created a remote workstation within the Admin Console you can manage and reconfigure it directly from the **Remote Workstations** page.

You can search for specific remote workstations by name by using the search bar in the table toolbar.

Entitling Users

Once you have created a remote workstation you can entitle users from the active directory account to specific remote workstations. The following section outlines how to entitle users:

1. Click the kebab option under the **ACTIONS** column to edit the desired remote workstation.
2. Click **Edit**.
3. Select the search bar and select the user you want to entitle:



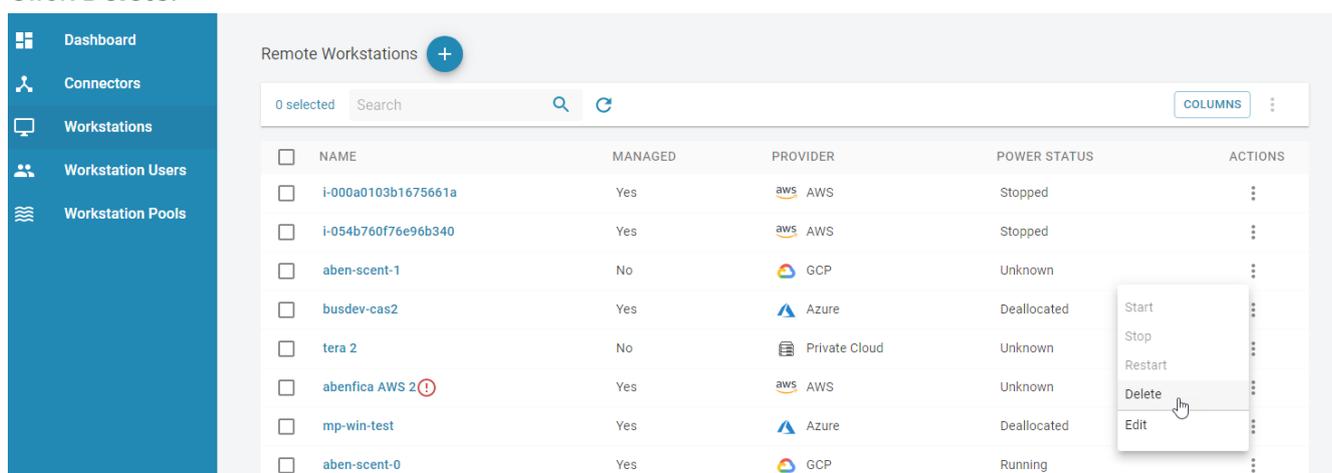
4. Click **Add** and then **SAVE**.

The user you entitled will appear in the *USER* column on the Remote Workstations page for that particular remote workstation.

Deleting Remote Workstations from the Public Cloud

You can delete existing remote workstations from AWS, Azure, and GCP from the Admin Console. Only remote workstations that exist in AWS, Azure, and GCP and are part of deployments that have valid cloud credentials can be deleted.

1. Click **Workstations** from the console sidebar to display your existing remote workstations.
2. Click the kebab option under the **ACTIONS** column.
3. Click **Delete**.



The screenshot shows the 'Remote Workstations' page in the Admin Console. The sidebar on the left contains navigation options: Dashboard, Connectors, Workstations, Workstation Users, and Workstation Pools. The main content area displays a table of workstations with columns for NAME, MANAGED, PROVIDER, POWER STATUS, and ACTIONS. A kebab menu is open for the 'abenfica AWS 2' workstation, showing options: Start, Stop, Restart, Delete, and Edit. The 'Delete' option is highlighted by the mouse cursor.

NAME	MANAGED	PROVIDER	POWER STATUS	ACTIONS
i-000a0103b1675661a	Yes	aws AWS	Stopped	⋮
i-054b760f76e96b340	Yes	aws AWS	Stopped	⋮
aben-scent-1	No	GCP	Unknown	⋮
busdev-cas2	Yes	Azure	Deallocated	⋮
tera 2	No	Private Cloud	Unknown	⋮
abenfica AWS 2	Yes	aws AWS	Unknown	⋮
mp-win-test	Yes	Azure	Deallocated	⋮
aben-scent-0	Yes	GCP	Running	⋮

4. Click **CONFIRM** from the resulting pop-up message.

The process for deleting the remote workstation has now begun. It is also possible to bulk delete more than one remote workstation at a time by selecting multiple remote workstations to delete from the Admin Console.

The remote workstation will disappear immediately from the Admin Console and can take 5-10 minutes to be deleted from the Anyware Manager and public cloud. You should monitor the workstation in your cloud provider to ensure a successful completion. You will be notified in the Admin Console on the whether the deletion was successful or not.

Viewing Remote Workstation Users

You can view all available Workstation users in your active directory by selecting the **Workstation Users** page. You can search for specific users by name with the search field in the toolbar. You can obtain the following user information for specific users:

- User Name
- User GUID
- Deployment
- Directory status
- User Groups
- Date of creation

When you select a specific user you will be shown all user groups and entitled remote workstations associated with this user:

< Admin ✔ Enabled

ACTIVE DIRECTORY USER INFORMATION

User Name	UserName-587-1561591856	Created On	Aug 21, 2019 08:18 AM PDT
User GUID	1-587-1561591856		
Deployment	deployment 1		

GROUPS

Name
CN=Group Policy Creator
Owners,CN=Users,DC=example,DC=com
CN=Domain Admins,CN=Users,DC=example,DC=com
CN=Enterprise Admins,CN=Users,DC=example,DC=com
CN=Schema Admins,CN=Users,DC=example,DC=com
CN=Administrators,CN=Builtin,DC=example,DC=com

ENTITLED WORKSTATIONS

Name	Power State	Assigned On
workstation1	Running	Aug 24, 2019 05:06 PM PDT
workstation2	Running	Aug 14, 2019 05:06 PM PDT

This gives your an overview of a specific user's entitlements and deployment information and can be useful for troubleshooting issues.

Updating Cloud Provider Information

Remote workstations that have been added into Anyware Manager, or created by Anyware Manager, can be associated to a cloud provider. This enables Anyware Manager to use the credentials for that cloud provider to access the remote workstation and enable power management. The cloud provider in which the remote workstation resides in can be changed. This can be done if either the remote workstation has been moved, or if the workstation was set to the Private Cloud, and you want to update it and assign it to the actual cloud provider.

Editing the cloud provider and zone information will not change the location of the remote workstation. This feature enables Anyware Manager to point to a different location to verify the remote workstation exists in the specified zone. If you do not have valid cloud credentials for a cloud provider you will not be able to change the remote workstation cloud provider.

The following section outlines how to update a remote workstation on the private cloud and associate it to a workstation in a public cloud:

1. Click the kebab option under the **ACTIONS** column to edit the desired remote workstation.
2. Click **Edit**.
3. From the **CLOUD INFORMATION** panel click **EDIT PROVIDER**.
4. Select the cloud provider the remote workstation belongs to.
5. Select the region, resource group and zone, depending on the cloud provider, the remote workstation resides in.
6. Select the remote workstation and update the provider.

If you enter the correct cloud provider and zone for the remote workstation you will receive a notification that it has been updated. The new zone, cloud provider and information will be listed on this page also.

If you enter an incorrect zone then you will receive an error message stating that the remote workstation does not exist in the entered zone.

AMT Power Management in Anyware Manager

Anyware Manager can use Intel® AMT to remotely power operate physical workstations. To be controlled remotely, a physical workstation within a deployment must have Intel AMT provisioned.

Provisioning Intel® AMT for Workstations

To use Intel® AMT, physical access to the workstation is required in order to perform manual provisioning and each workstation needs to be provisioned for Intel® AMT. Support for AMT power operations is not limited to workstations made by HP. Support for AMT version 12 is provided by default. AMT versions as low as AMT 9 are also supported with the selection of the **Enable support for AMT 11 or lower** toggle in the UI that allows communication via the less secure TLS 1.1 protocol.

Transport Layer Security(TLS) Configuration Required

Only TLS connections are supported by the Anyware Manager to communicate with Intel® AMT devices. Non TLS or Mutual TLS (mTLS) connections are not supported. As the network traffic is unencrypted before setting up TLS, HP recommends performing manual provisioning and configuration in a closed network.

PROVISIONING INTEL® AMT

A brief overview of provisioning HP Workstations is available in the [Setting up and configuring Intel® AMT in HP Business Notebooks, Desktops, and Workstations](#) white paper provided by HP. For more detailed information about provisioning AMT, please refer to the documentation provided by Intel: [Intel® Active Management Technology Implementation](#).

Perform the following steps to enable and provision Intel® AMT for interoperation with HP Anyware Manager:

1. Power on the workstation.
2. During POST press F6 or Ctrl+P to enter the MEBx setup menu (this depends on the model of the workstation).
3. Select **MEBx Login** and enter the default password “admin”.

4. Create a new password. For best practices regarding AMT passwords, refer to the [Setting up and configuring Intel® AMT in HP Business Notebooks, Desktops, and Workstations](#) white paper provided by HP.
5. Select **Intel® AMT Configuration**.
6. Select **Power Control**.
7. In **Host Sleep States** section, ensure that the **Intel® AMT ON** option is set to *On* in S0, and *ME Wake* in S3 and S4-5.
8. Press **Esc** key to go back to the previous menu.
9. Select **Activate Network Access**.
10. Press **Y** to activate network access.
11. Exit the MEBx setup menu.

Intel® AMT provisioning setup is now completed. To verify the provisioning is correctly configured, open a web browser and go to `http://<hostname>:16992` and sign-in in with the username “admin” and the password that was created above.

Enterprise Provisioning

Enterprise provisioning is not currently supported in the Anyware Manager.

Communication Security

TLS

Transport Layer Security(TLS) is required by the Anyware Manager to communicate with the Intel® AMT device in an encrypted form. The AMT device holds a server certificate that must be trusted by the Manager to establish a connection. To avoid name mismatch errors, the FQDN/IP used for the workstation by the Manager must match the Common Name or a Subject Alternative Name of the certificate.

DIGEST

The Manager uses a digest username and password to connect to an AMT device. The username and password must be saved in the Manager for each workstation to which the Manager will connect via AMT. The passwords used for AMT are encrypted when stored by the Manager.

 **Password Tip**

Consider using different passwords for each AMT device as this reduces the area of attack if a single password is compromised.

Configuring Transport Layer Security(TLS) for Anyware Manager

TLS can be configured using MeshCommander, an open source Intel® AMT management console. Click [here](#) to download and install MeshCommander. The steps to configure TLS using MeshCommander are as follows:

1. Open MeshCommander.
2. If you do not already have a Root Certificate configured, follow these steps:
 - a. Open the **Certificate Manager** tab.
 - b. Create a Root Certificate.
 - c. View the new Root Certificate and save the `.pem` file.
 - d. Import the public key of the `.pem` file to the **Provider Service Accounts** page of the Anyware Manager.
 - The Manager service needs to trust this certificate.
 - This single trusted Root certificate should be used to issue TLS certificates for each workstation going forward.
3. Open MeshCommander and click the **Computer Management** tab.
4. Add the provisioned workstation.
5. Connect to the workstation.
6. Open the **Security Settings** tab.
7. Click **Add Certificate** and add the root certificate as a **Trusted Root Certificate**.
8. Click **Issue Certificate** and use the root certificate to issue a TLS Server (HTTPS) certificate.
9. Ensure that the common name matches the FQDN/IP you intend to use for connecting the workstation to the Anyware Manager.
10. Click **link next** to *Remote TLS Security*.
11. Select the newly issued certificate and Server-auth TLS only.
12. Click **OK**.

13. Reconnect with the workstation with TLS connection.

TLS connection is configured with the workstation. When TLS is enabled, you can access the web interface through `https://<hostname>:16993`.

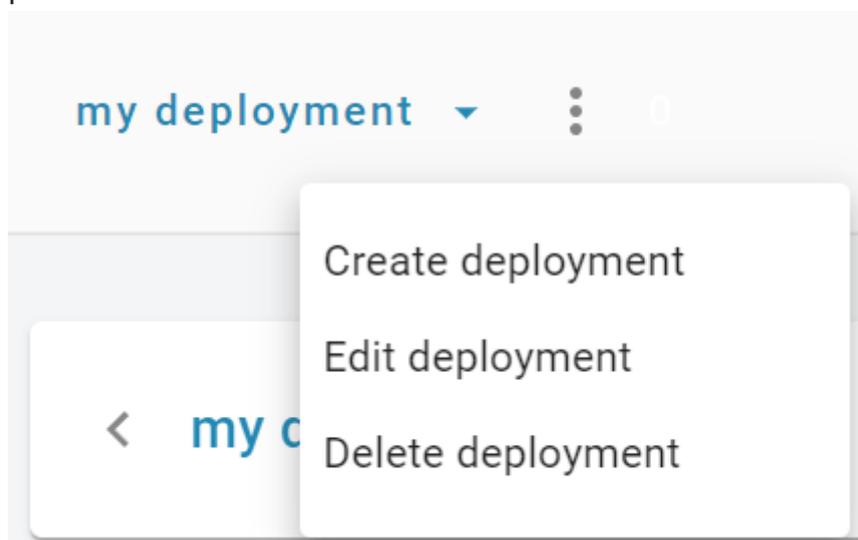
Root certificate for TLS

When enabling TLS through MeshCommander, a Root Certificate and private key can be imported from the file system. This process needs to be done for each workstation individually.

Creating Intel® AMT Workstations in Anyware Manager

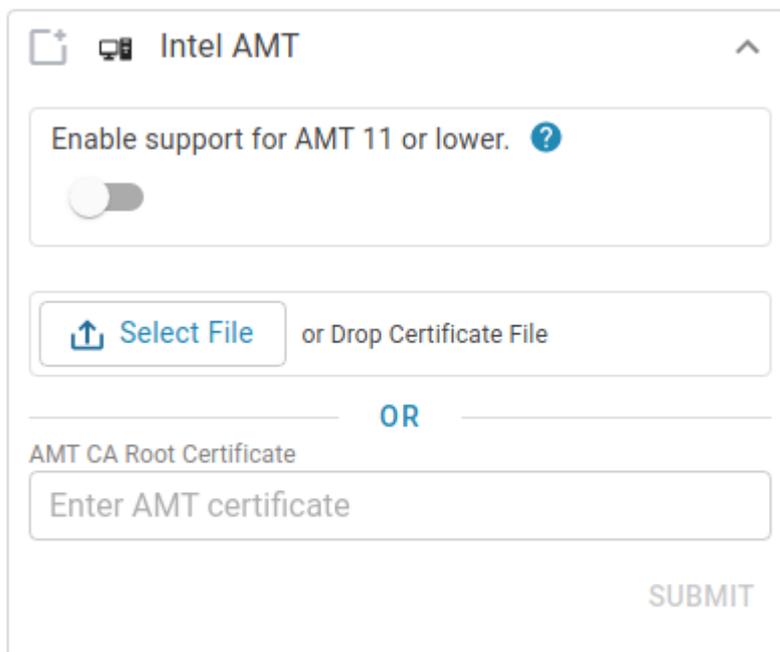
When Intel® AMT provisioning and TLS configuration is complete, workstations can then be added to the Anyware Manager administrative console. You need to edit an existing deployment in order to add workstations. If you do not have an existing deployment, you will have to create one. For detailed steps, See [Managing Deployment](#). To create Intel® AMT workstations, do the following:

1. In Anyware Manager, click **Edit deployment** from the kebab option to edit your deployment to provide the trusted Root Certificate to the Intel® AMT Provider Service Account



2. Under **Provider Service Accounts** open the Intel® AMT account box.

3. Click **Select File**, browse and upload a Root Certificate public key file in the `.pem` format from your system. You can also copy and paste contents from the Root Certificate public key file to the **AMT**



The screenshot shows a window titled "Intel AMT" with a close button, a refresh icon, and a help icon. Below the title bar, there is a toggle switch for "Enable support for AMT 11 or lower." with a question mark icon. Below that is a button labeled "Select File" with an upload icon, followed by the text "or Drop Certificate File". A horizontal line with "OR" in the center separates this from the "AMT CA Root Certificate" section. This section contains a text input field with the placeholder text "Enter AMT certificate". At the bottom right of the form is a "SUBMIT" button.

CA Root Certificate section.

4. Click **Submit**.
5. If you do not have an existing Connector, you should create one. For detailed steps, Click [here](#).
6. Add workstations for the Intel® AMT service provider. Make sure to use the same FQDN/IP For each workstation that matches the Common Name or Subject Alternative Name of the workstation's AMT server certificate. For detailed steps, see [Adding a Remote Workstation](#).

Authorized Access

You can set up authorized access to the workstations for individual users or pools. Authorized access can be configured at any time.

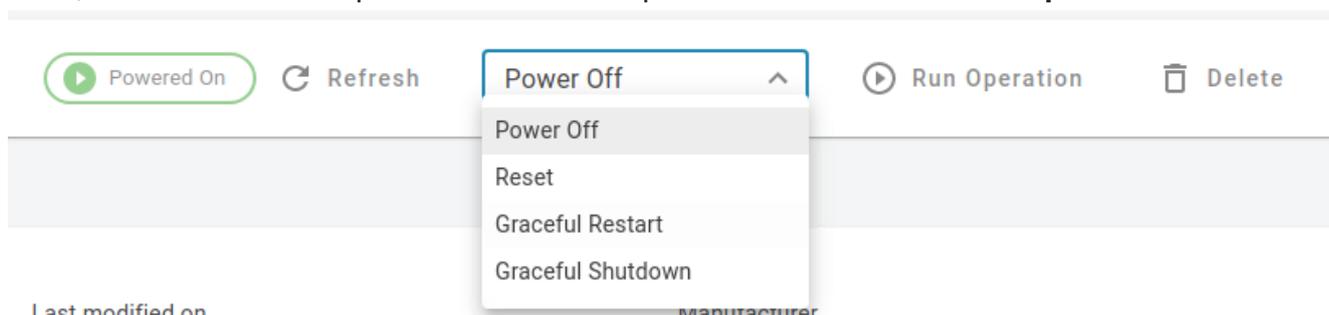
7. Open the workstation added for Intel® AMT. Under the **Provider Information** section, enable the **Managed by Anyware Manager** toggle. If the credentials are not entered an error message *This workstation cannot be managed by Intel AMT without administrator credentials* is displayed.
8. If the AMT network interface is not the same as the LAN IP/FQDN, use the Alternate AMT IP/FQDN field to specify the AMT network interface reachable by the Manager.
9. Populate the digest username and digest password for the workstation in the Intel® AMT Username and Intel AMT Password fields and click **Save Credentials**. It validates with AMT that the digest credentials are correct, even if the **Managed by Anyware Manager** toggle is off.

Workstation configuration for Intel® AMT is complete.

Intel® AMT Power Operations

Once the workstations are added and the Intel® AMT configuration is completed, you can manage power operations for each workstation in the **Workstations** or **Workstations Pools** page:

1. Open a desired workstation.
2. The current available power operations are shown in the drop-down menu. To change the power state, select the desired operation from the drop-down menu and click **Run Operation**.



- Available remote power operations are:

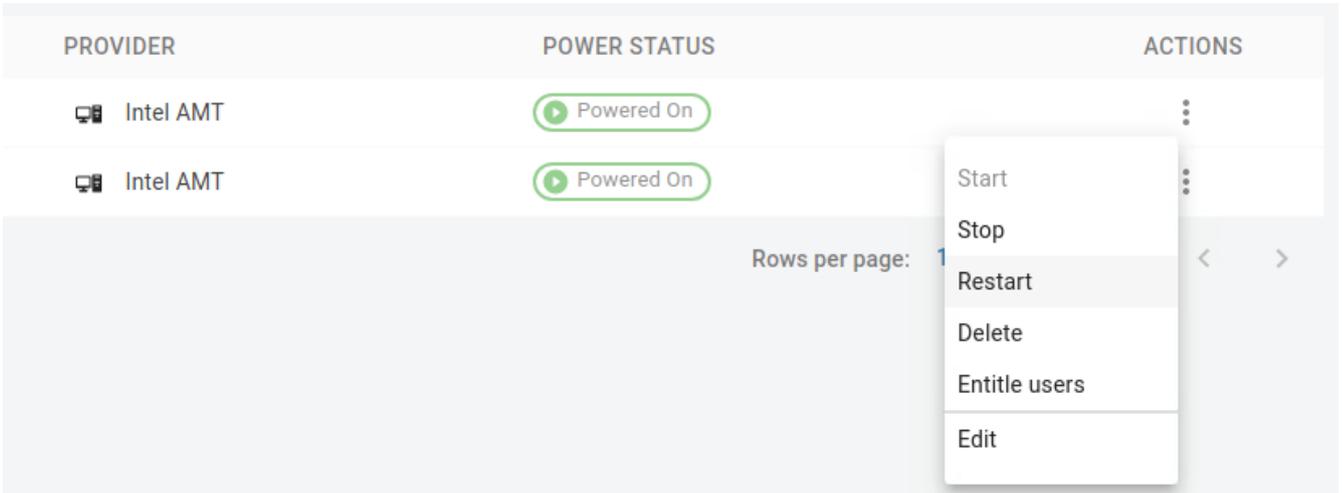
- Power On
- Power Off
- Graceful Shutdown
- Reset
- Graceful Restart

Graceful Power Options

Intel® Management and Security Application Local Management is required to support graceful power operations. Graceful Shutdown requires Intel® AMT version 9 or greater and Graceful Restart requires Intel AMT version 10 or greater.

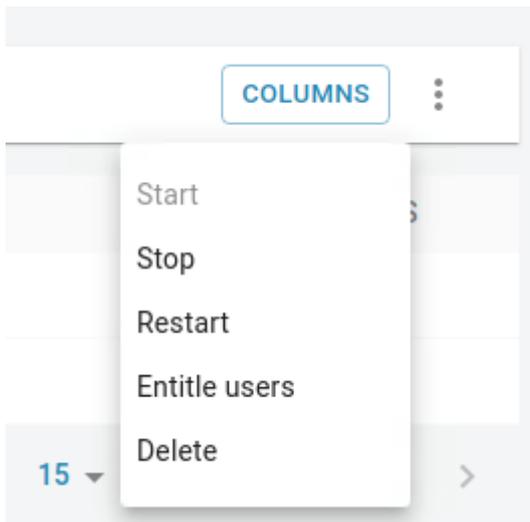
You can also execute power operations on a single workstation or on multiple workstations from the **Workstations** or **Workstations Pools** page:

1. Under the **ACTIONS** section, click the kebab option to select the desired power operation.



- Available remote power operations are:
 - Start (Power On)
 - Stop (Power Off)
 - Restart (Reset)

To execute power operations on multiple workstations, select the desired workstations using the checkbox column on the leftmost side of the table and then select the kebab option on the top right next to the **COLUMNS** button and choose the desired power option.



For a Pool of workstations follow the same steps as above from the **Workstations Pools** page.

Power Operation Cooling time

Once a power operation is triggered, the Manager will not permit another power operation to be sent for 20 seconds in order to protect the AMT device.

Intel® AMT Troubleshooting Errors

When interacting with an Intel® AMT workstation in Anyware Manager, some errors can occur. Reference the following table for more information on these errors.

Error Message	Interpretation
Network timeout occurred	A network timeout occurred when trying to reach the workstation on the provided FQDN/IP. The workstation could not be reached.
FQDN/IP does not match AMT certificate subject	The certificate representing the individual AMT workstation did not have a Common Name or Subject Alternative Name matching the FQDN/IP provided in the Manager to connect to the workstation. These fields must match in order for the Manager to have confirmation it is interacting with the intended workstation.
AMT root certificate does not match Intel provider CA certificate	The root certificate which signed the individual AMT workstation certificate does not match the root certificate which was entered into the Intel Provider Service Account page. The root certificate present in the chain of the workstation certificate is not trusted.
Error validating management credentials:	There was an error while trying to verify digest credentials for the workstation with AMT. See error text for details.
No credentials found.	No digest credentials have been saved for the workstation, so the Manager cannot interact with AMT.

System Alerts

Anyware Manager System Alerts

Anyware Manager monitors all workstations in your deployment managed by Intel® AMT for system alerts. The alerts in the AMT log will appear as errors on Workstations in the Anyware Manager console until they are resolved.

There are some prerequisites for enabling systems alerts. They are:

- Workstations should be Intel® AMT provisioned.
- Workstations should be managed by Intel® AMT Provider in Anyware Manager.
- For HP ZCentral 4R Workstations, the [ZCentral Hardware Monitor](#) package should be installed to detect Power Supply alerts.

Supported System Alert Events

Following system alert events are supported for all Workstations that meet the prerequisite criteria:

System Boot Errors

For all AMT Management enabled Workstations:

- **Host OS shut down unexpectedly:** This error occurs if the Operating System has a critical failure. In Windows Systems this is usually seen as a *Blue Screen* error. Resetting the Host is a way to recover from this error, but further maintenance could be required if the problem persists.
- **Host failed to boot to the OS:** This error occurs if the Host is unable to boot the operating system in a timely manner or when there's an issue during the POST action. Resetting the Host is a way to recover from this error, but further maintenance could be required if the problem persists.

Power Supply Errors

For HP ZCentral 4R Workstations with AMT Management enabled:

- **Two Power Supply Units installed in Redundant Mode (one Power Supply Unit is offline. Thus, no redundancy):** This error occurs when the Workstation detects one of its power supplies is offline. In this case, the power supply redundancy is compromised. There could be a problem with the Power Supply.
- **Two Power Supply Units installed in Non-Redundant Mode (one Power Supply Unit is offline. System is in a lower power configuration):** This error occurs when the Workstation detects one of

its power supply is offline. In this case, the power supplies power output is compromised. There could be a problem with the Power Supply.

Configure System Alert checks

Anyware Manager checks for system alerts on all AMT managed Workstations at a regular interval. Workstations that are actively being viewed in the Admin Console can be expected to be polled more frequently than the configured polling interval. The Interval can be configured as follows:

1. In **Admin Console**, navigate to the **PROVIDER SERVICE ACCOUNTS**.
2. Ensure a CA Root Certificate is uploaded. If not, paste or upload a CA Root Certificate and click **Submit**.
3. When the certificate is submitted, you can see a slider. Move the slider to adjust the system alert time interval.

✓ Intel AMT
^

Older TLS version support

Enable support for AMT 11 or lower. ?

Polling Interval

Configure the interval to get state updates for all managed AMT workstations (in minutes). ?

5 10 15 20 25 30 35 40 45 50 55 60

AMT CA Root Certificate

```
-----BEGIN CERTIFICATE-----
MIIDZzCCAk+gAwIBAgIDCWITMA0
GCSqGSIb3DQEBCwUAMFQxHzAd
BgNVBAMTFkFNVF9UTFNfVGVzdF
9Sb290X0NlcnQxDDAKBgNVBAYT
A1VTQTERMA8GA1UECBMIQ29sb
```

DELETE

The polling interval for system alerts is now configured.

Anyware Monitor

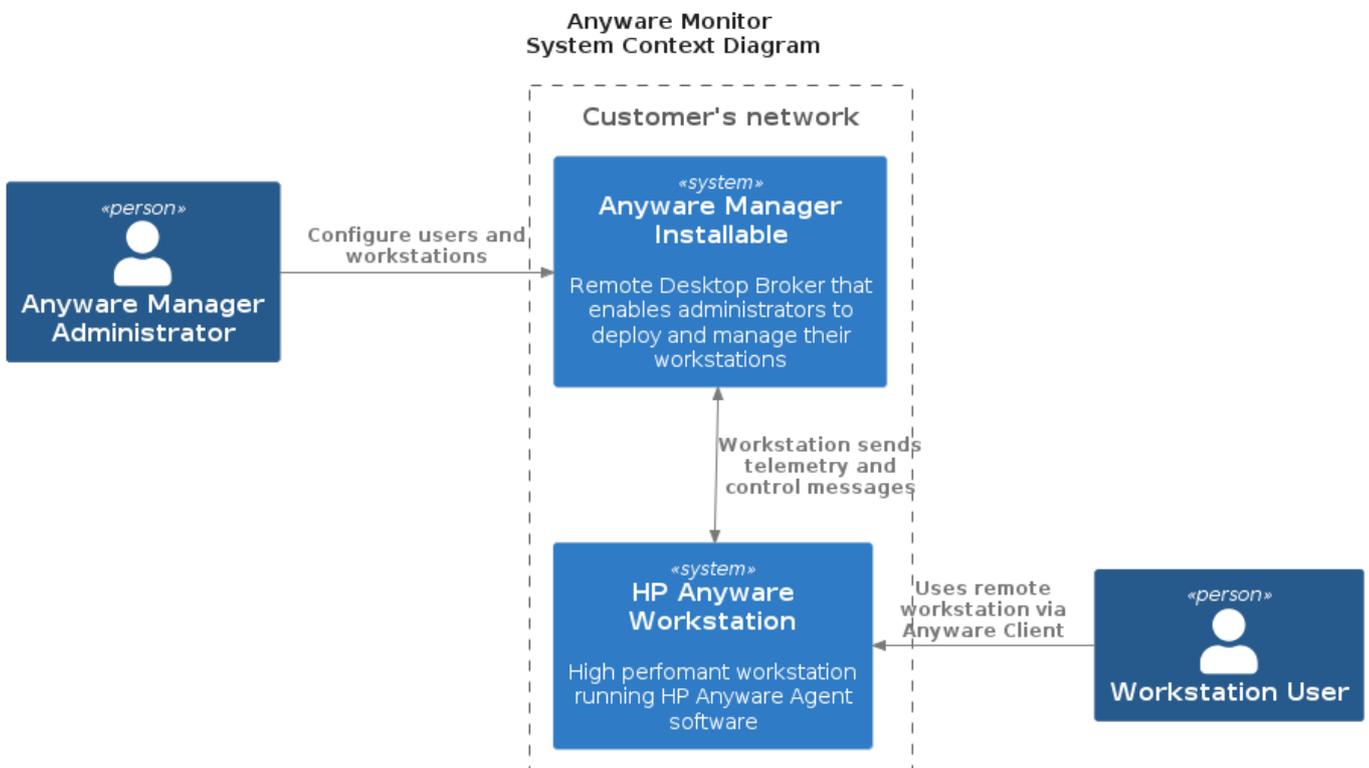
Using Anyware Monitor

Anyware Monitor enables you to review and monitor the connection health and general information regarding the remote workstations configured in your deployment. The Monitor also allows you to monitor connection status, manage sessions with remote workstations, log off users from remote workstations, and send notifications to the remote workstation.

ANYWARE MONITOR ARCHITECTURE

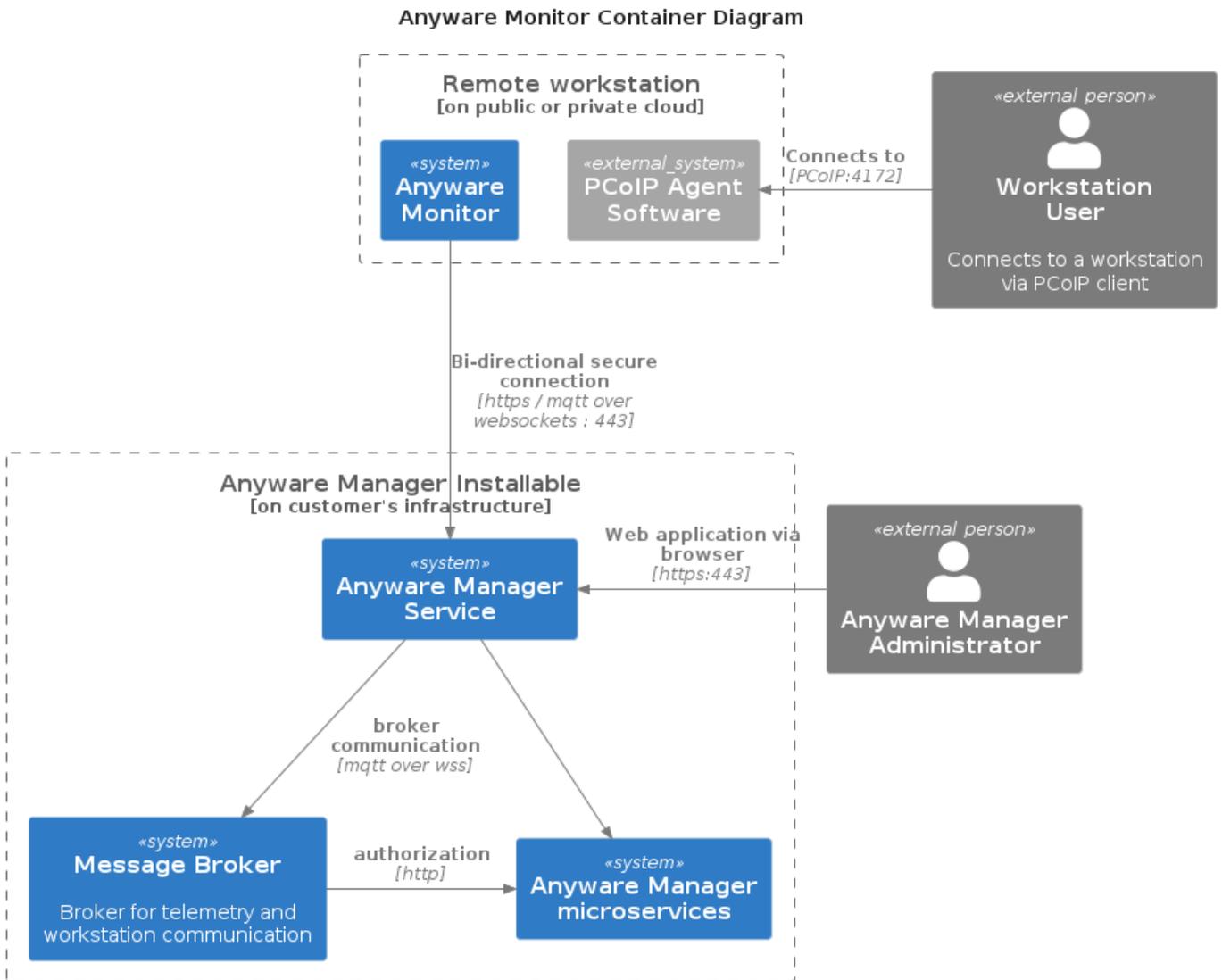
Anyware Monitor System Context

The following diagram provides the context of the overall Anyware infrastructure and the actors that are involved in it. The Anyware Manager Administrators can configure the users and the corresponding workstations using Anyware Manager and users can connect to those workstations remotely using a PCoIP Client.



Anyware Monitor Container Diagram

The following diagram depicts the various components and the role of Anyware Monitor in the HP Anyware architecture.



ANYWARE MONITOR CONNECTION STATUS

The status of the Anyware Monitor on a workstation can be viewed by selecting the applicable workstation from the **Workstation Management** page. The overview and Anyware Monitor tab reports the connection status.

OVERVIEW USER MANAGEMENT ANYWARE MONITOR SESSION INFORMATION

WORKSTATION INFORMATION

Workstation ID 631ba2e803fe931383ef21d7	Created On Sep 9, 2022 02:32 PM MDT	Last modified on Dec 6, 2022 12:21 PM MST
Anyware Monitor Version 23.01.0	Anyware Monitor Connection Healthy	

OVERVIEW USER MANAGEMENT **ANYWARE MONITOR** SESSION INFORMATION

ANYWARE MANAGER MONITOR CONFIGURATION

Version 23.01.0	Connection Healthy	Last Connection Dec 6, 2022 02:00:38 PM MST
--------------------	------------------------------	------------------------------------------------

Enabling this feature allows Anyware Manager Monitor to send information about workstation telemetry to Anyware Manager. This can be used by your administrator to view which users are currently in session and end sessions. Session Tracking must be enabled in Edit Deployment -> Connector Settings to view the session information.

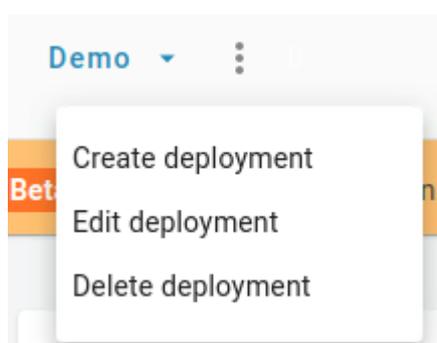
Enable Anyware Monitor ?

SESSION TRACKING

Enabling Session Tracking

To configure the Monitor for session status tracking, the deployment Connector settings must be enabled:

1. In the Admin Console, click the kebab option in the dashboard and select **Edit Deployment**.



2. Navigate to the **Connector Settings** and enable the **Session Tracking** Toggle.
3. Navigate to the **Anyware Monitor** section in the **Workstations** tab and enable the **Enable Anyware Monitor** toggle.

OVERVIEW USER MANAGEMENT **ANYWARE MONITOR** SESSION INFORMATION

ANYWARE MANAGER MONITOR CONFIGURATION

Version	Connection	Last Connection
23.01.0	Healthy	Dec 6, 2022 02:00:38 PM MST

Enabling this feature allows Anyware Manager Monitor to send information about workstation telemetry to Anyware Manager. This can be used by your administrator to view which users are currently in session and end sessions. Session Tracking must be enabled in Edit Deployment -> Connector Settings to view the session information.

Enable Anyware Monitor 

The Anyware Monitor Session tracking is now enabled.

Session Tracking

When the Monitor is enabled and is in a **Healthy** state, session information can be viewed in the Workstation's **Session Information** tab or in the **Session** column in the **Remote Workstations** table.

The Monitor reports the username in session with the following session states:

- In Session - A user is logged into a desktop session.
- Ending Session - A pending state while the monitor attempts to log users off.
- No active users found for this workstation - No users are logged into a desktop session.

Note

Log off Workstation Session

When managing session tracking, the Anyware Monitor provides the ability to log users off of workstations. This gives the benefit of releasing PCoIP connections to free up licenses as well as cleaning up the workstation for next user.

To disable this feature on an individual workstation, disable the **Enable Anyware Monitor** toggle within the Workstation's Anyware Monitor tab.

Note

This action will only log out users logged into a desktop session, not a tty session.

There are four ways users can be logged out from a session with a workstation.

Floating pool log out user when floating assignment is ended

When the user's floating assignment with a workstation in the floating pool is ended, the user is logged off to free up the PCoIP session and free up the workstation to other users who can access the pool.

Persistent Pool log out user when user is unassigned

When a user is unassigned from a workstation in a persistent pool, the user is logged off to clean up the workstation. Similarly, if you assign a new user to a workstation that is already assigned to a current user, the current user is logged off to clean up the workstation.

Removing user assignment from workstation

In the Workstation's **User Management** page, when a user is unassigned from a workstation, that user is logged off to free up the workstation for another assignment.

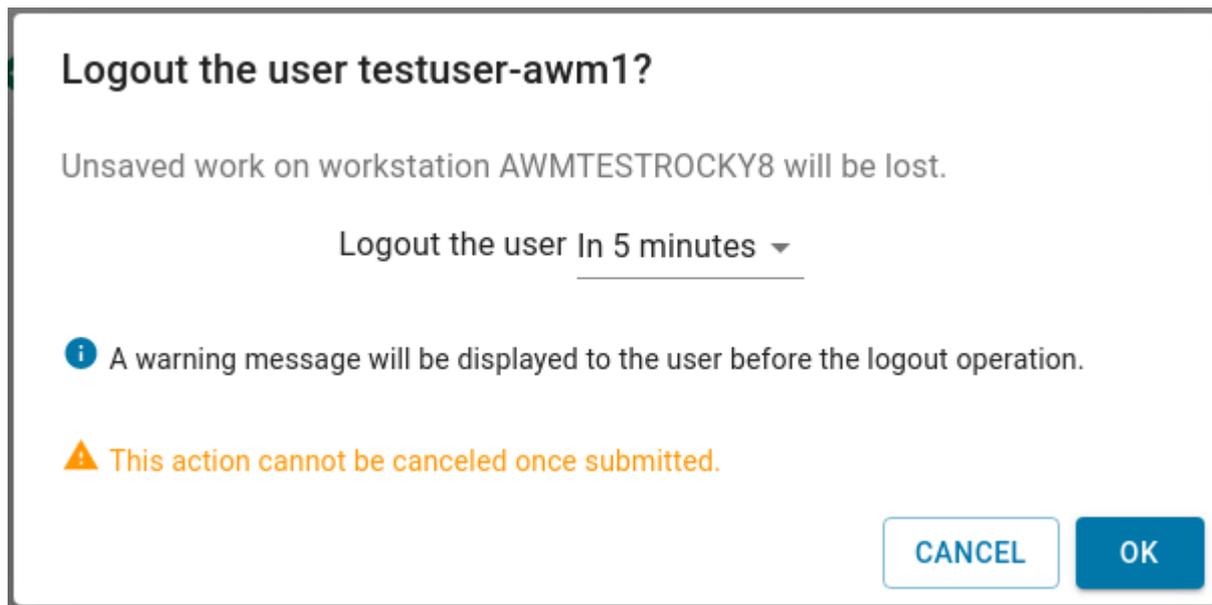
Admin manually log out user in a session

You can manually log off a PCoIP session to free up the workstation for a new user.

There are two ways to manually log out users:

- In the Workstation's **Session Information** tab, select the **logout** icon under the Actions column.
- In the **Session** column of the **Remote Workstations** table, click the username of the user to be logged out.

Select a timespan in which to log out the user and confirm the action.



Note

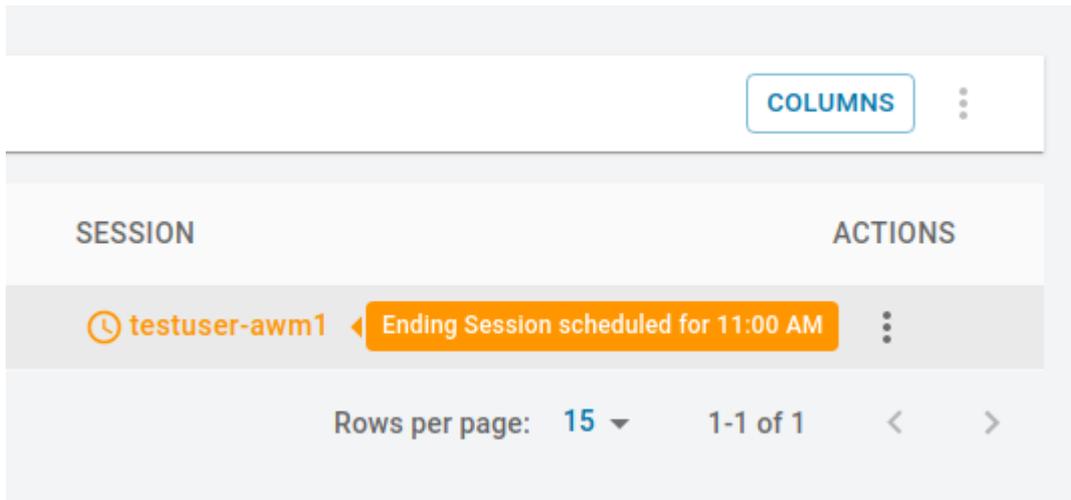
This action is possible for any workstation regardless of its Pool association, and only logs out users in a desktop session, not a tty session.

For logouts that are not immediate, the admin console shows the time at which the logout will occur:

- **Session Information** tab shows the logout time in the **Status** column

OVERVIEW	USER MANAGEMENT	ANYWARE MONITOR	SESSION INFORMATION
SESSION STATUS			
User Name	Status	Actions	
testuser-awm1	Ending Session scheduled for 4:27 PM		
Updated at Dec 6, 2022 04:24:14 PM MST			

- **Session** column of the **Remote Workstations** table shows the logout time upon hovering over the username

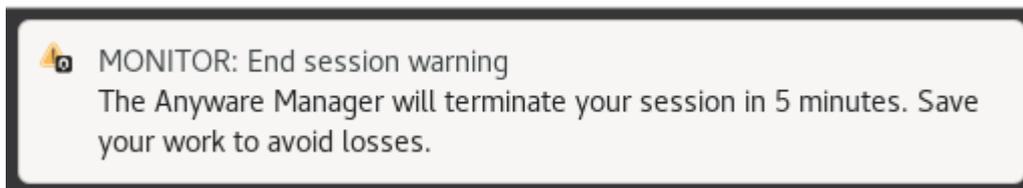


The screenshot shows a table with two columns: 'SESSION' and 'ACTIONS'. The first row contains a session ID 'testuser-awm1' with a clock icon, followed by a warning notification: 'Ending Session scheduled for 11:00 AM'. The table has a 'COLUMNS' button and a vertical ellipsis menu in the top right. Below the table, there is a pagination control showing 'Rows per page: 15' and '1-1 of 1'.

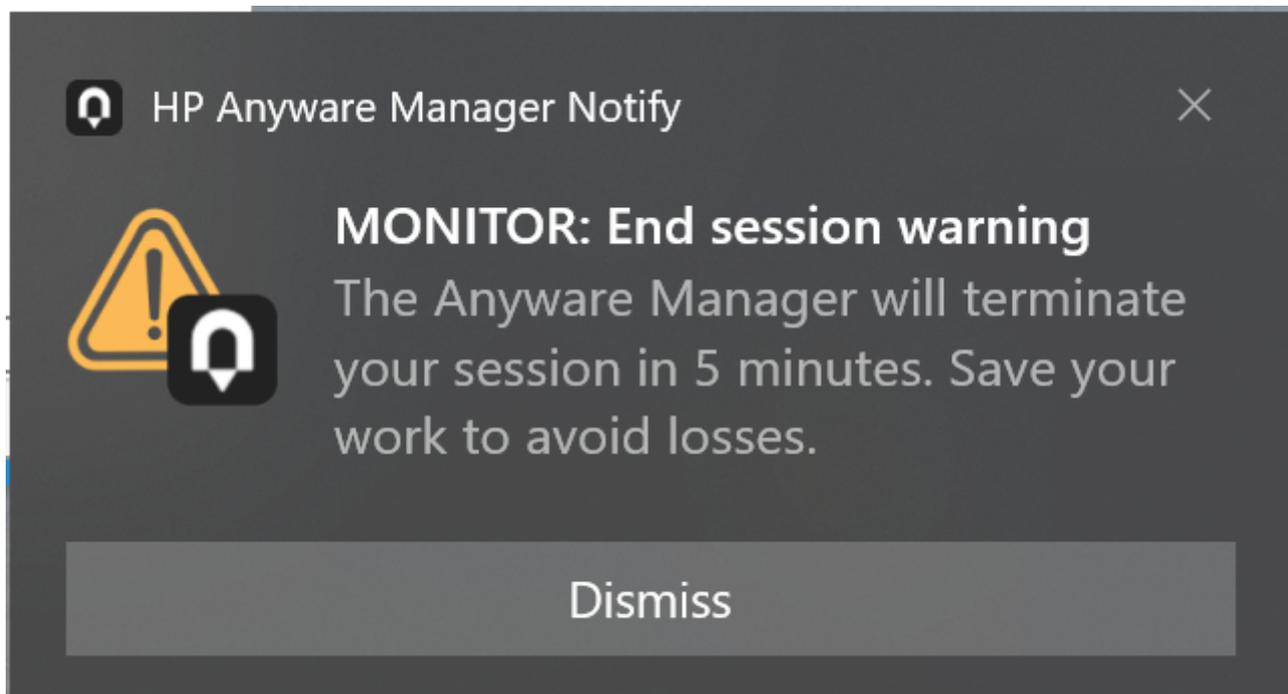
SESSION	ACTIONS
 testuser-awm1	 Ending Session scheduled for 11:00 AM

When a logout is scheduled, a notification warning is displayed that a logout occurs approximately 5 minutes before the scheduled logout time. For immediate logouts, there is no logout notification.

- Example of logout warning notification on Linux

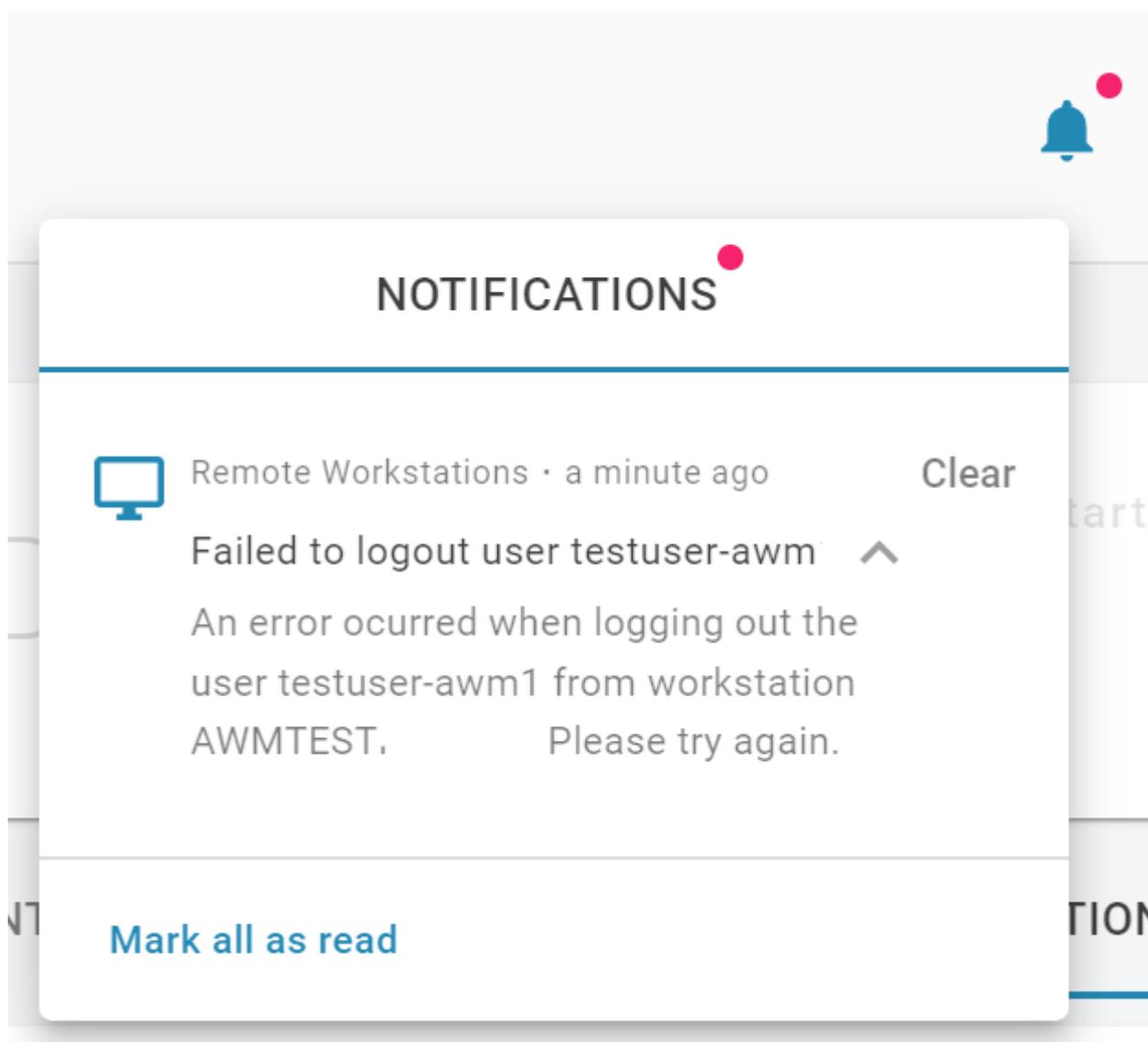


- Example of logout warning notification on Windows



Note

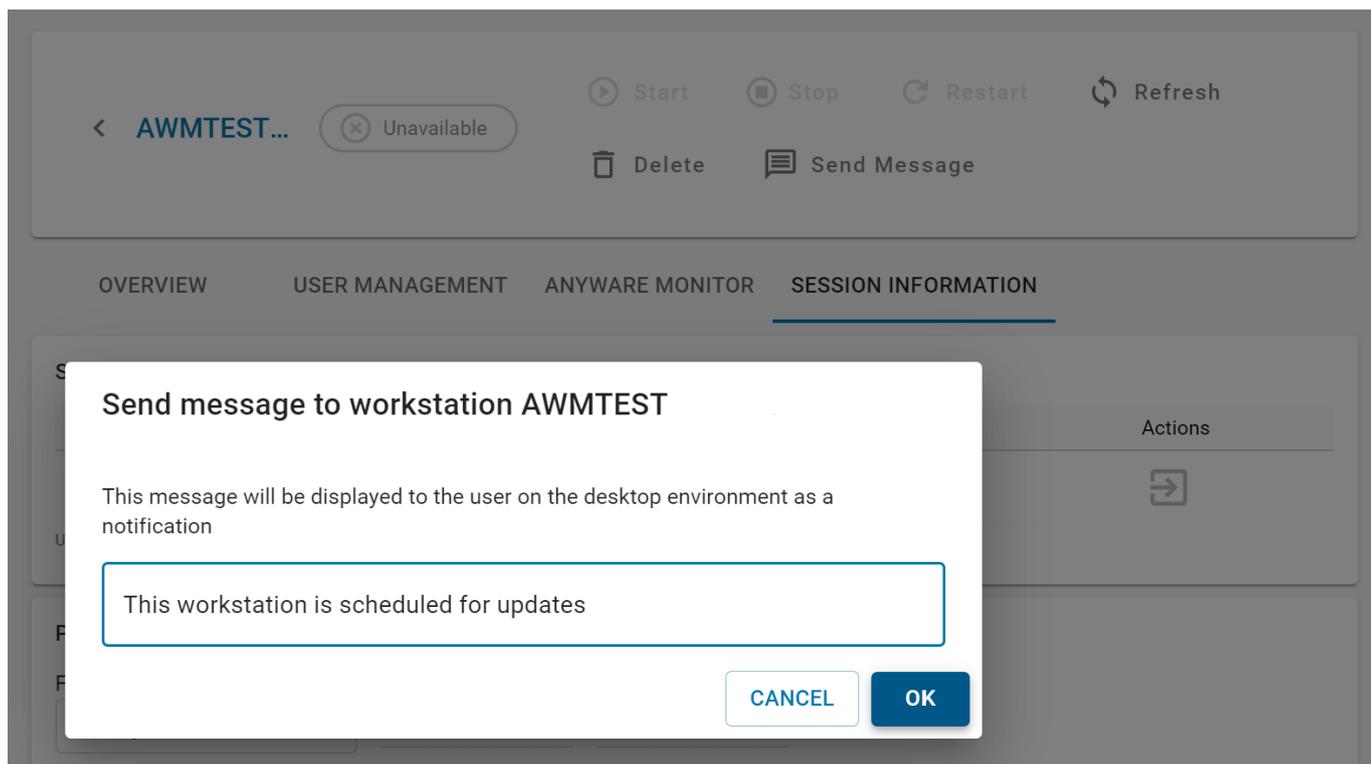
If the user is not logged out due to network errors, the notification center will warn the admin that the log out attempt was unsuccessful.



Manual Notifications

You can send a notification to the workstation with any message of your choosing.

In the **Workstation** page, select **Send Message**, fill in message, and select **OK**.



The workstation displays the message to any currently logged in users of a desktop session.

Note

Notifications must be enabled on Windows to show Monitor Notifications. Instructions to enable notifications can be found in [Enabling notifications on Windows 10 and 11](#).

Warning

Notifications are not currently supported on Wayland Display server on Linux, so if you are using a version of Linux that uses Wayland by default (Ubuntu 18.04 or later, CentOS / RHEL 8 and later), you need to disable it, and use the Xorg server instead.

If you have already installed a PCoIP Agent, the installer disables Wayland for you. If not, follow the steps below to disable it:

1. Locate the correct configuration file for your OS.
2. Ubuntu- `/etc/gdm3/custom.conf`
3. CentOS/RHEL- `/etc/gdm/custom.conf`
4. Open the file with `sudo/root privileges` command.

5. Uncomment `WaylandEnable=false` by deleting the `#` at the beginning of the line.
6. Restart the VNC Server.

Installing/Uninstalling Anyware Monitor

Anyware Monitor is an official component of the HP Anyware Software that can be installed on remote workstations, and you can enable it from the **Admin Console**.

INSTALLING ANYWARE MONITOR

Anyware Monitor is supported on the following operating systems:

- Windows 10 21H1, 21H2
- Windows 11 21H2, 22H2
- Windows Server 2019, 2022
- Ubuntu 18.04 LTS
- Ubuntu 22.04 LTS
- RHEL 7.8, 7.9, 8
- CentOS 7.8, 7.9
- Rocky Linux® 8

To install **Anyware Monitor**:

1. Open the Admin Console, and navigate to the **Workstations Management** page.
2. From the list of all active remote workstations, select the workstation on which you wish to install the Anyware Monitor.
3. Select the **Anyware Monitor** tab.
4. If the End user license agreement (EULA) is present, read and accept the EULA.

 **Once accepted, End user license agreement (EULA) for Anyware Monitor does not appear again unless it is updated.**

Anyware Monitor Functionality

On accepting the EULA, the Anyware Monitor defaults to enabled, but can be toggled at any time. Disabling the Anyware Monitor stops the Monitor from sending telemetry data to the Anyware Manager and disables session tracking and logout functionality.

5. Choose a TLS validation level.

The Anyware Monitor installer automatically generates certificates to ensure that communication to the Anyware Manager is done over encrypted TLS connections. Toggling the Validate TLS certificate button performs no validation of any certificate during download and registration events, and should be used if the Anyware Manager is using its default certificates.

When choosing the default option to verify the TLS certificate, the Anyware Manager needs to be configured with a valid TLS certificate issued by a certificate authority, and the Anyware Monitor host operating system needs to trust this certificate. For more information regarding how to configure the Anyware Manager to use a custom valid TLS certificate, see [Configuring Custom TLS Certificates](#).

Anyware Monitor Downloads

Downloads for Anyware Monitor are serviced by Azure. If the Monitor fails to reach Azure, downloads are serviced by the Manager. This allows Installation and registration for dark sites.

1. Copy the following operating system specific command as shown in the image below:

INSTALL INSTRUCTIONS

- 1. Accept the HP Anyware End User License Agreement
The terms and conditions were accepted.
- 2. Install and register the Anyware Manager Monitor
Copy and run the generated command in a terminal with administrator privileges. This will install and register the Anyware Manager Monitor. When the process is complete, we will attempt to establish a connection.

Validate TLS certificate 

LINUX® **WINDOWS**

```
curl -1sLfS https://manager.fqdn.here/latest/awm_monitor_install.sh |  
sudo -E manager_uri=https://manager.fqdn.here
```

(command is only valid for 1 hour.)

COPY

Running this command on Workstations downloads the Anyware Monitor and its dependencies, installs the Monitor, and registers the Workstation with the Anyware Manager.

Warning

For each Workstation, you need to generate a token using a new command by following steps 1 to 5. The command carries an unique token used to identify the Workstation inside the Anyware Manager and should not be reused on different Workstations. For installing on multiple workstations with the same command, see [Anyware Monitor Bulk Installation](#).

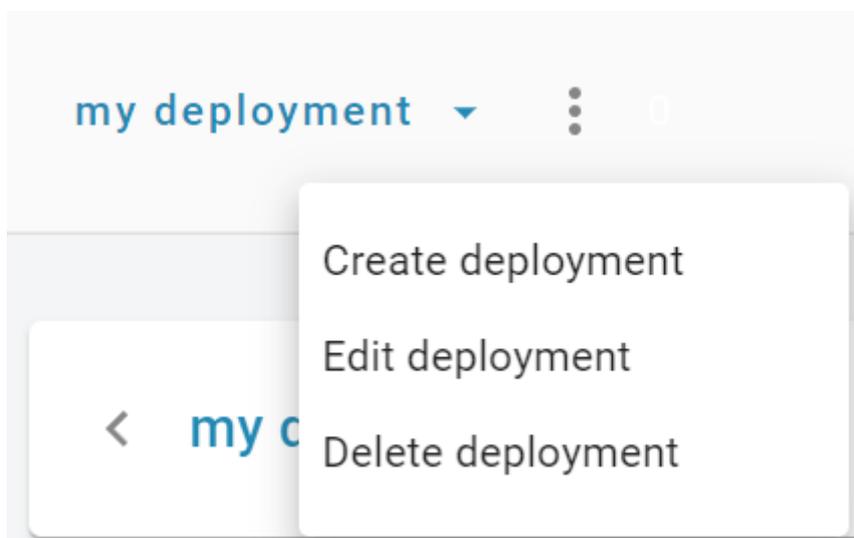
2. Run the command inside a terminal from your chosen workstation with administrative privileges.
3. Once the installation and registration has succeeded, you can see your Workstation with a connection status of Healthy. The Anyware Monitor feature is ready to use.
4. Repeat steps 1 to 7 for installing Anyware Monitor on each subsequent workstation added in Anyware Manager.

ANYWARE MONITOR BULK INSTALLATION

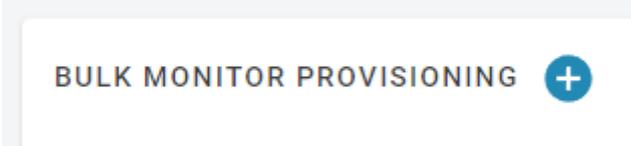
To expedite the deployment of several monitor installations, a bulk enrollment option is available. This option uses a single command that can be passed to any number of machines to start an automated process of installation and registration. It should be noted that machines do not need to be added to the **Workstations** page prior to bulk installation of the Monitor; for your convenience, the bulk installation process automatically adds new Workstations where the Monitor has been installed as long as the enrollment request is approved. For darksite installations, please see more information about the concurrent download limit below.

To facilitate Anyware Monitor Bulk installation:

1. Open the Admin Console and click the kebab option in the dashboard and select **Edit Deployment**.



2. Navigate to the **Anyware Monitor** section in the **Workstations** tab, click "+" next to **Bulk Monitor Provisioning** and enter a Command Name.



BULK MONITOR PROVISIONING +

3. If the End user license agreement (EULA) is present, read and accept it.

 **Once accepted, End user license agreement (EULA) for Anyware Monitor does not appear again unless it is updated.**

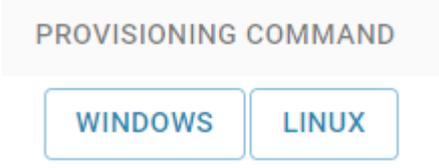
4. Choose a TLS validation level. See [Step 5](#) in Installing Anyware Monitor for details on TLS validation level.



VALIDATE TLS ?



5. Select an Operating System to generate a command that is copied to your clipboard.



PROVISIONING COMMAND

WINDOWS

LINUX

6. Run the copied command with administrator privileges on all the machines on which you want to install the Monitor.

 **The machines do not need to be added in the workstation page before this step**

7. After the command successfully completes, Anyware Monitor is installed, but must be approved to complete registration.

 **There is a very generous time limit on approving pending Monitor registration requests (currently set to three years, but could be subject to change in the future). As long as the enrollment account key has not been revoked, pending Monitor registration requests can be approved. This permits delayed installation of the Anyware Monitor in cases where it is desired.**

8. Navigate to the **Workstation Management** page and click on **SEE HOSTNAMES** to navigate to the Pending Monitor Provisions page.

You have 2 new monitor provisions to approve.

[SEE HOSTNAMES](#)

9. Choose one of the following actions for each machine:

ADD - Indicates that the machine has not yet been added to the Anyware Manager. Sends a message to the Anyware Monitor and gives it permission to proceed and complete registration, and adds this machine to the Workstations Page.

LINK - Indicates that the machine was already added to the Anyware Manager. Sends a message to the Anyware Monitor and gives it permission to proceed and complete registration.

REJECT - Sends a message to the Anyware Monitor that it should not proceed with registration. Once this action is selected, this machine needs to be re-enrolled or re-registered to enable Anyware Monitor.

UPDATE - Indicates that there was a mismatch between when Anyware Monitor was enrolled and the current machine was added or deleted from the workstation page. Once this action is selected, the mismatch will be fixed and it will be possible to either add or link. By hovering over the warning icon in the **Host Name** column, the reason for the need to update will be shown.

A healthy monitor status indicates registration was a success.

⚠ Concurrent Installations on Dark sites

The Anyware Manager on a dark site can support up to 50 concurrent installs from Anyware Monitors at a time. If your deployment plan for installing Monitors requests more than 50 concurrent Monitor installs at a time, it is recommended to spread them out either consecutively or in batches of no more than 50 at a time. Failure to do so may cause moderate lag on the UI, and possible failed installations and registrations with the Manager.

Anyware Monitor Golden Image Installation

To facilitate the deployment of Anyware Monitor while using golden images, you can use the following steps to pre-install on the source machine used to create a golden image

1. Run the following commands with administrator privileges. This runs a script to download the appropriate installers to your golden image and installs the Monitor on your machine.

Windows

```
powershell.exe -noexit ". { Invoke-WebRequest -useb https://  
anyware.azureedge.net/awm-monitor/release/23.04/latest/awm_monitor_install.ps1 }  
| Invoke-Expression; install -skip_registration 1;exit"
```

Linux

```
curl -lsLfs https://anyware.azureedge.net/awm-monitor/release/23.04/latest/  
awm_monitor_install.sh | sudo -E skip_registration=true bash
```

 **This first step requires access to `anyware.azureedge.net`. If you need to create an image on a dark site see, [Troubleshooting Anyware Monitor](#).**

2. After creating new machines from the golden image, you need to run a second command to start the enrollment process. This begins the enrollment process as described in [Anyware Monitor Bulk Installation](#).
3. Follow steps 1-6 in [Anyware Monitor Bulk Installation](#) to get the provisioning command.
4. This command must be edited to add a **skip_installation** flag to avoid reinstalling the Monitor on each newly created replica of the golden image. Edit your command by adding the skip installation flag, just after the token string like the examples below:

Windows

```
powershell.exe -noexit ". { Invoke-WebRequest -useb https://manager.fqdn.here/  
awm_monitor/latest/awm_monitor_install.ps1 } | Invoke-Expression; install -  
manager_uri https://manager.fqdn.here -token enrollmenttoken -skip_installation  
1 -mode enroll;exit"
```

Linux

```
curl -lsLfS https://manager.fqdn.here/awm_monitor/latest/awm_monitor_install.sh  
| sudo -E manager_uri=https://manager.fqdn.here token=enrollmenttoken  
skip_installation=true mode=enroll bash
```

 **Your commands may look different if you choose to disable TLS validation when generating your command.**

5. Continue following Steps 7-12 from [Anyware Monitor Bulk Installation](#) to complete the enrollment and registration process.

REVOKING TOKENS

Enrollment Accounts

The Key used in the Provisioning Command for Bulk Enrollment can be revoked. Once this action is completed, the generated command is no longer authorized to initiate bulk enrollment on any new workstations. Any workstations that used this token and already approved the enrollment and completed registration successfully are able to authenticate and communicate with the Manager. However, any workstations that is still pending enrollment lose the ability to complete the registration process.

To revoke an enrollment account key:

1. In the Admin Console, click the kebab option in the dashboard and select **Edit Deployment**.
2. Navigate to the **Anyware Monitor** section in the **Workstations** tab.
3. Under **Bulk Monitor Provisioning**, chose the command you want to revoke the key for, and click the trash icon under the Revoke column.

Workstation Accounts

When the Anyware Monitor is installed and registered with the Anyware Manager, a service account is created that authorizes communication between the Monitor and the Manager. These service accounts are visible by navigating to the Deployment's edit page and navigating to the **Anyware Monitor** section in the **Workstations** tab. This service account can be deleted.

To revoke a workstation's service account:

1. In the Admin Console, click the kebab option in the dashboard and select **Edit Deployment**.
2. Navigate to the **Anyware Monitor** section in the **Workstations** tab.
3. Under **Approved Monitor Installations**, choose the workstation you want to revoke the service account for, and click on the trash icon under the Delete column.

Deleting Workstation Service Accounts

This action is permanent. To reestablish communication, repeat the install process to register the workstation again.

REMOVING HP ANYWARE MONITOR

If you do not require the Anyware Monitor, it can be easily removed/uninstalled.

For Windows OS:

1. Navigate to **Add or Remove Programs** in the Windows settings.
2. Locate the HP Anyware Monitor instance and click **Uninstall**.

For Linux OS:

Use the package manager to remove the `awm-monitor` package. You can run the following commands:

Example for Ubuntu:

With apt:

```
sudo apt remove awm-monitor
```

Example for RHEL:

With yum:

```
sudo yum remove awm-monitor
```

With dnf:

```
sudo dnf remove awm-monitor
```

Troubleshooting Anyware Monitor

In the event that there is an issue with the Anyware Monitor, the following rectification steps may be useful to help fix the issue. Some of the known issues with the Anyware Monitor are:

Registration Fails after installation or Monitor Fails to start after installation

Occasionally the network may fail during registration process or it is possible that the authorization token that the script carries has expired. If the registration fails and the token is less than one hour old, run the install script again.

If the registration fails and the token is more than one hour old, generate a new script command with a refreshed token by navigating to the Workstation's Anyware Monitor tab and select Show Install Instructions for a refreshed command and try again.

OVERVIEW USER MANAGEMENT **AWM MONITOR** SESSION INFORMATION

ANYWARE MANAGER MONITOR CONFIGURATION

Version 23.01.386-dev	Connection Healthy	Last Connection Aug 16, 2022 04:40:03 PM MDT
--------------------------	-----------------------	-------------------------------------------------

Enabling this feature allows Anyware Manager Monitor to send information about workstation telemetry to Anyware Manager. This can be used by your administrator to view which users are currently in session and end sessions. Session Tracking must be enabled in Edit Deployment -> Connector Settings to view the session information.

Enable AWM Monitor 

INSTALL INSTRUCTIONS

Looks like you already have an Anyware Monitor installed in this workstation, but if you want to see the install instructions again, click the show install instructions button.

[SHOW INSTALL INSTRUCTIONS](#)

Workstation is unexpectedly marked as Unhealthy

Restart the service using your operating system service tool:

- On Windows, click on the **Start** Menu and type `services.msc` to open the **Windows Services list**. Navigate to the HP Anyware Monitor service, select and restart it using the left pane menu.
- On Linux®, open a terminal and run the command: `systemctl restart awm-monitor`.

Notifications do not appear in a workstation as expected

Ensure that your machine has PCoIP Agent installed on it:

- On Windows, ensure that notifications are enabled. For more information, see [Enabling notifications on Windows 10 and 11](#).
- On Linux, ensure that you have it configured to not use Wayland display server. For more information, see [Manual Notifications](#).

There is a known issue in Linux machines where notifications may not be displayed to the user. While most supported Linux desktop configurations are expected to work, there are rare instances where the system is unable to identify the user's desktop session id required to issue a notification.

In this case, a default location is used. If a Linux system is not showing notifications, the log may state "Using default dbus address". This location is not guaranteed to be present either, resulting in the system incapable of rendering a notification.

Enabling notifications on Windows 10 and 11

You can enable notifications by performing the following steps:

1. Navigate to **Start** menu and click **Settings**.
2. Click the **System** tab and select **Notifications & actions**.
3. Enable the **Notifications** toggle.

Notifications

Get notifications from apps and other senders



You can also enable notifications by editing Windows Registration using a PowerShell Command and restarting the workstation.

Run the following command:

```
Set-ItemProperty -Path "HKCU:  
\Software\Microsoft\Windows\CurrentVersion\PushNotifications" -Name  
"ToastEnabled" -Type DWord -Value 1
```

These actions only enable notifications for the current user. This can be further automated to apply the setting for multiple users.

Bulk Enrollment Failures

Running the command outputs a TLS/SSL error

- Check the configuration of certificates on the machines, or disable the certificate validation toggle for the bulk provisioning command and run again.

Enrollment Fails with exit error code of 1

- The console should output error messages that can help determine the root cause. When in doubt, generating a new command and trying again should help to resolve the issue.

Enrollment fails with error: "The Anyware Monitor was unable to detect a hostname or IP address required for Bulk Enrollment."

- Bulk Enrollment requires a hostname or IP address. The system will try to detect this. In the rare event that the system cannot detect a hostname or IP address, one of the following options is recommended:
 - Ensure that the machine's hostname is configured properly.
 - Register this machine independently. For more information, see [Installing/Uninstalling Anyware Monitor](#).

After Adding or Linking the machine, the machine does not show as Healthy after some time

- The Monitor tries to proceed with registration when you choose the **ADD** or **LINK** option for a machine during installation. If there is a temporary network issue, the message may not be received or there may be an issue with registration. To help determine root cause, inspect the Monitor logs. For more information, see [Anyware Monitor Logs](#).

Creating a Golden Image on a dark site

The procedure outlined in [Anyware Monitor Golden Image Installation](#) requires access to public internet to reach `anyware.azureedge.net`.

If you need to create a golden image on a dark site, you need to replace the first step with the following steps:

1. Follow steps 1-6 in [Anyware Monitor Bulk Installation](#) to get the provisioning command.

- This command must be edited to add a **skip_registration** flag to limit the command to only download and install the Monitor. Edit your command by adding the skip registration flag, just after the token string like the examples below. You may also remove the **token** and **manager_uri** parameters as they are not required for install.

Windows

```
powershell.exe -noexit ". { Invoke-WebRequest -useb https://manager.fqdn.here/  
awm_monitor/latest/awm_monitor_install.ps1 } | Invoke-Expression; install -  
skip_registration 1 -mode enroll;exit"
```

Linux

```
curl -lsLfS https://manager.fqdn.here/awm_monitor/latest/awm_monitor_install.sh  
| sudo -E skip_registration=true mode=enroll bash
```

 **Your commands may look different if you choose to disable TLS validation when generating your command.**

- Run the commands with administrator privileges. This runs a script to download the appropriate installers to your golden image and installs the Monitor on your machine.

Anyware Monitor Logs

For information and diagnostic purposes, Anyware Monitor records logs internally to a file.

- In the affected Workstation, navigate to the folder where HP Anyware Monitor is installed:
 - On Windows (by default): `%PROGRAMFILES%\HP\Anyware Manager Monitor`
 - On Linux: `/opt/awm-monitor`
- Open the file `log4net.config` using a Text Editor.
 - Change the line `<level value="INFO">` to `<level value="DEBUG">`.
 - Save the changes you have made to the file.
- Restart the HP Anyware Monitor service:
 - On Windows, click on the Start Menu and type `services.msc` to open the Windows Services list. Scroll down to the HP Anyware Monitor service, click on it and restart using the left side menu.
 - On Linux®, open a terminal and run the command: `systemctl restart awm-monitor`
- Reproduce the issue that you are facing.

- Navigate to the following folder to view the content of the log file:
 - On Windows: `%PROGRAMDATA%\HP\Anyware Manager Monitor`
 - On Linux®: `/var/log/awm-monitor`

Viewing Log content on Linux

On Linux, the log content can also be viewed realtime by running the command

```
sudo journalctl -u awm-monitor -f.
```

HP ZCentral Hardware Monitor

HP ZCentral Hardware Monitor-Installation

The **HP ZCentral Hardware Monitor** is an optional ZCentral software component that enhances the System Alerts experience. When installed, Anyware Manager can monitor the state of Power Supply units for ZCentral 4R systems and display alerts as errors on the Anyware Manager console.

System Requirements

1. A supported hardware platform (Currently only HP ZCentral 4R workstations are supported).
2. The most up-to-date Intel® AMT Firmware.
3. Supported operating systems such as:
 - Windows 10
 - Red Hat Enterprise 7
 - Red Hat Enterprise 8
 - Ubuntu 18.04
 - Ubuntu 20.04

When installing on Windows the following are also required:

- Intel® Management Engine Interface Driver (Intel® Management Engine Software [Chipset Driver] softpaq from the HP Drivers website)
- Microsoft Visual C++ 2015-2019 Redistributable

HP ZCentral Hardware Monitor Installation

To install the Hardware Monitor, download and run the installer package for one of the following supported platforms, which is available on the Installers page of the Anyware Manager console:

- Windows
- Red Hat 7, Red Hat 8

- Ubuntu-18.04, Ubuntu-20.04

The package will include the Hardware Monitor installer and an install script.

Install Scripts

The installer packages come with an installation script (`install.cmd` for Windows and `install.sh` for Linux) that determines the platform support for HP ZCentral Hardware Monitor. If supported, then the Hardware Monitor is installed. The installers can be executed manually if required.

- **Linux Script:** To upgrade a package, instead of performing a fresh install, the script can be passed the `--upgrade` argument. This ensures that the rpm uses the upgrade command on a Red Hat Linux OS. On a Debian OS the `dpkg` command does not change.
- **Windows Script:** By default, the script only calls `msiexec /i MSI`. Any arguments should be additionally passed to the script. This can be done for both installers or individually. Run `install.cmd` with `--help` to view the available arguments.

SIGNATURE VERIFICATION

Hardware Monitor installation packages are digitally signed to ensure security and integrity of the package upon download. You can verify these digital signatures to ensure sanctity of the installation package before installing them on your system.

A gpg key indicates who signed the package. Details for the hardware monitor gpg signature key can be found below.

- Download the public key from the link that says **Download signature key** on the installation page of the Anyware Manager console. This link becomes visible when a platform is selected from the operating system dropdown field.
- Key ID: HP ZCentral Connect hpss-admin@hp.com
- Fingerprint: 66CF 5025 AA35 1EB7 CC78 136F C75F B106 E198 51F0

You can verify *gpg* signatures using a *gpg* key. Files such as `.tar.gz`, `zip`, `.deb` have a *gpg* signature. The `.msi` Windows installer file has a Windows operating system signature that can be viewed by right-clicking the file and examining its security properties.

VERIFY DIGITAL SIGNATURES ON .TAR.GZ, .ZIP, .DEB FILES

Verify Signature on Windows OS

To verify gpg signatures on a Windows OS, a 3rd party tool such as **GPG4Win** is required to add GPG support.

To verify the signature:

1. Import the public key to the *gpg* key ring by running the following command:

```
gpg --import GPG-KEY-hpzcentralconnect
```

After executing this command, the output on the command line should be as follows:

```
gpg: key E19851F0: public key "HP ZCentral Connect <hpss-admin@hp.com>"
imported
gpg: Total number processed: 1
gpg: imported: 1 (RSA: 1)
```

1. Verify the signature of the `.deb`, `.tar.gz` or `.zip` file by passing the corresponding signature file (the signature file ends in the `.asc` extension) with the file to be verified. Run the following command:

```
gpg --verify hp_zcentral_hardware_monitor_rhel.tar.gz.asc
hp_zcentral_hardware_monitor_rhel.tar.gz
```

After executing this command, the output on the command line should be as follows:

```
gpg: Signature made XXX XX XXX 2020 XX:XX:XX XX MST using RSA key ID E19851F0
gpg: Good signature from "HP ZCentral Connect <hpss-admin@hp.com>"
gpg: WARNING: This key is not certified with a trusted signature!
gpg: There is no indication that the signature belongs to the owner.
Primary key fingerprint: 66CF 5025 AA35 1EB7 CC78 136F C75F B106 E198 51F0
```

Trusted Signature

If you want to remove the trusted signature warning message, you can instruct the gpg tool to trust the key by using the following commands:

```
gpg --edit-key "HP ZCentral Connect"  
gpg> trust  
gpg> <Select your level of trust>  
gpg> quit
```

VERIFY DIGITAL SIGNATURES ON .RPM FILES

To verify the signature:

1. Import the public key to the `.rpm` key ring by running the following command:

```
rpm --import GPG-KEY-hpzcentralconnect
```

1. Verify the signature of the `.rpm` file by running the following:

```
rpm --checksig hpzcentralconnecthardwaremonitor.rpm
```

After executing this command, the output on the command line should be as follows:

```
hpzcentralconnecthardwaremonitor.rpm: rsa sha1 (md5) pgp md5 OK
```

Supported Events

The ZCentral Hardware Monitor scans the health of the Power Supply Units on HP ZCentral 4R workstations while the OS is running. The dual Power Supply Units (PSUs) on a 4R are each in 1 of 3 states: 1. Uninstalled. 2. Installed and Providing Power. 3. Installed and Not Providing Power.

Additionally, when 2 Power Supply Units are installed, they are configured in Redundant or Non-redundant (Aggregate) mode depending on the workload of the workstation. This configuration is done through BIOS and the Hardware Monitor gathers this information during start-up.

The following is a list of states that the Hardware Monitor is aware of:

- 2 Power Supplies installed and providing power running in redundant mode. (Good State)

- 2 Power Supplies installed and providing power running in non-redundant mode. (Good State)
- 1 Power Supply installed and providing power. (Good State)
- 2 Power Supplies installed but only 1 providing power running in redundant mode. (Error State)
- 2 Power Supplies installed but only 1 providing power running in non-redundant mode. (Error State)

HP ZCentral Hardware Monitor-Troubleshooting

In case the HP ZCentral Hardware Monitor fails or malfunctions, you should undertake the following corrective and review measures:

HP ZCENTRAL HARDWARE MONITOR LOGS

The logs for ZCentral Hardware Monitor are available in the following locations:

- On Windows: `%PROGRAMDATA%\HP\ZCentralConnectHardwareMonitor\HardwareMonitor.log`.
- On Linux®: `/var/log/hpzcentralconnecthardwaremonitor/HardwareMonitor.log`.

To change the level of information displayed in the log files, edit the `log4net.config` file and change the line to DEBUG. The `log4net.config` file is available in the following locations:

- On Windows (by default): `%PROGRAMFILES%\HP\ZCentralConnectHardwareMonitor\bin\log4net.config`.
- On Linux®: `/opt/hp/zcentralconnecthardwaremonitor/log4net.config`.

The Hardware Monitor also logs to the **Windows Event Log** under **Application logs** on a Windows OS.

HP ZCENTRAL HARDWARE MONITOR INSTALLATION ERRORS AND WARNINGS

Errors: *This application requires Microsoft Visual C++ 2015-2019 Redistributable.* - The Windows installer and the Hardware Monitor require the Visual C++ 2015-2019 Redistributable for the installation. The installation fails without it. The `vc_redist.x64.exe` package should be downloaded from Microsoft and installed before reattempting installation.

Warning: *HP ZCentral Hardware Monitor requires the Intel® Management Engine Interface driver to be installed.* - Without the Intel® Management Engine Interface driver, the Hardware Monitor service is unable to start, but it is installed. The driver can be installed by installing the Intel® Management Engine Software (Chipset Driver) softpaq for the platform. It is available for download on the HP Drivers website (<https://www.hp.com/drivers>). Once the driver is installed the service can be started.

HP ZCENTRAL HARDWARE MONITOR ERRORS

Error Code	Error Message	Resolution
2	Logger could not be configured. Ensure log4cpp.config is present and correctly formatted.	Ensure the file exists and has not been corrupted. To recreate this file, please reinstall the Hardware Monitor.
3	Unable to access SMBIOS information.	Ensure service is running with administrator permissions and BIOS is up to date.
4	SMBIOS does not contain System Info (Type 1) table.	Ensure the most current version of the supported BIOS is in use.
5	SMBIOS does not contain Power Supply (Type 39) table.	Ensure the most current version of the supported BIOS is in use.
6	The number of Power Supply (Type 39) SMBIOS tables is not expected.	Ensure the most current version of the supported BIOS is in use.
7	The Unit Group values of the power supplies do not match.	Ensure the most current version of the supported BIOS is in use.
9	Power supply monitoring is not supported on this platform. Initialization failed.	Ensure platform is a ZCentral 4R workstation.
10	The SWTools Driver failed to be initialized.	Ensure service is running with administrator permissions.
11	The Power Supply Monitor was unable to be initialized.	Ensure service is running with administrator permissions.
12	The Power Supply Monitor was unable to map physical memory.	Ensure service is running with administrator permissions.
13	The Power Supply Monitor was unable to unmap physical memory.	Ensure service is running with administrator permissions.
14	The Power Supply Monitor Driver was unable to be cleaned up.	Ensure service is running with administrator permissions.
15	HP ZCentral Hardware Monitor is not supported on the current platform.	Ensure platform is a ZCentral 4R workstation.
16	Failed to enumerate installed drivers.	Ensure service is running with administrator permissions.
17	The Intel® Management Engine Interface driver is not installed. The Intel® Management Engine Software (Chipset Driver) softpaq for this platform can be downloaded from the HP Drivers website (https://www.hp.com/drivers).	Install Intel® Management Engine Software (Chipset Driver) softpaq.

Admin Console Configuration

Setting Time and Date

You can configure the time zone, time format and date format within the Admin Console. This enables you to ensure the time zone is set to your local time zone or else to the time zone into which your remote workstations are deployed. The current date and time format provided by the web browser will be the default preference used.

The following steps outline how to set date and time preferences:

1. Click **Preferences** from the user account icon within the Admin Console.
2. Select the desired Date format, Time zone and Time format.
3. Click **SAVE**.

The new date and time preferences will now be applied globally where applicable across the entire Admin Console.

Activity Log

The Anyware Manager activity log enables you to view a record of all activity and operations performed in your Anyware Manager environment. You can choose whether to show all records or just the records from a selected deployment. To view the activity log from the Admin Console:

1. Click the user account icon within the Admin Console.
2. Click **Activity Log** to display the activity log for that deployment.

The logs will show the date, user account, source and activity details.

You can search for logs based on specific operations that occurred. You can download all the logs available in Anyware Manager by clicking the **Download CSV** button. For information on Anyware Manager levels and how they impact the activity log, see [Anyware Manager](#).

Activity Log Expiration Timeframe

The Activity Log in the Admin Console contains short-term data, up to 7 days. After 7 days the log data expires. To maintain your long term storage Teradici recommends downloading the .csv file regularly.

Accessing the Activity Log through Anyware Manager APIs

Anyware Manager offers a RESTful API as an alternative to using the Admin Console. It allows for programmatic management and automation of resources in Anyware Manager deployments.

The following API page details how you can obtain these Activity Logs using the Anyware Manager APIs: <https://cam.teradici.com/api/docs#tag/Activity-Logs>

The Get activity logs and download activity logs API calls enable users to get the logs and download them as a .csv file.

Troubleshooting

Anyware Manager

Anyware Manager Support Bundle

If you encounter an issue installing the Anyware Manager or with the application itself, it is possible to generate a support bundle that can be sent to the HP support team to investigate and resolve.

To generate the support bundle, run the following command:

```
sudo /usr/local/bin/anyware-manager diagnose --support-bundle
```

If this command is successful, a tar.gz file will be located under the `/tmp` folder with a name formatted as follows:

`/tmp/anyware-manager-support-bundle-yyyymmddThhmmssZ.tar.gz`

`yyyymmddThhmmssZ` represents the date and time the support bundle was created.

Support Bundle Information and Logs

The support bundle will collect the various information from the system and then zip the files into a `.tar.gz` file in the `/tmp` directory.

Once you unzip the file the structure will be as follows:

- **files/etc** folder contains files with OS level information:
 - **issue** file contains a copy of all contents from the `/etc/issue` file.
 - **os-release** file contains all operating system identification data that was found in the `/usr/lib/os-release` file.
 - **/systemd/system/k3s.service** folder contains the information about `k3s.service` configuration.
- **files/var/log/anyware-manager** folder collects all of the Anyware Manager log files, for example generate, configure, diagnose, install logs.

The **out** folder collects outputs from running various commands to expose the details of relevant system information and Anyware Manager backend services, as outlined below:

- **os** folder contains the following files:
 - **dmesg.out** file contains the output of command `dmesg`.
 - **ls_-l@var@crash.out** file contains the output of the command `ls -l /var/crash`.
 - **pgrep_-l_k3s.out** file contains the output of the command `pgrep -l k3s`.
 - **ps_wwauxfx.out** file contains the output of the command `ps wwauxfZ`.
 - **ss-aux.out** file contains the output of the command `ss -ax`.
 - **who.out** file contains the output of the command `who`.
 - **dnf_list_--installed_--disablerepo=*.out** file contains the packages that are currently installed on the system and their versions.
- The **firewall** folder contains the outputs of the command `firewall-cmd --list-services`.
- The **network** folder displays the following network files:
 - **netstat_-Wnap.out** file contains the output of the command `netstat -Wnap`.
 - **ip_add.out** file contains the output of the command `ip add`.
 - **selinux** folder contains the following files:
 - **semodule_-l.out** file contains the output of the command `semodule -l`.
 - **sestatus.out** file contains the output of the command `sestatus`.
- The **deployments** folder contains the following files:
 - **kubectl_get_deployment.out** file is the output of the command `kubectl get deployments` that lists the status of all deployments for Anyware Manager services.
 - The description of the deployment for each of the deployments through the output of the command `kubectl describe`.
 - The deployments information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- The **pods** folder contains the following files:
 - **kubectl_get_pods.out** file is the output of the command `get pods` that lists the status of all pods for Anyware Manager services.
 - The description of a pod for each of the pods through the output of the command `kubectl describe pod`

- The pod information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- **logs** folder contains the following files:
 - The log files for each pod.
 - The logs files are retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- The **services** folder contains the following files:
 - **kubectl_get_services.out** file is the output of the command `get services` that lists the status of all services for Anyware Manager services.
 - The description of a service for each of the services through the output of the command `kubectl describe services`
 - The services information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- **secrets** folder displays the output of the command `kubectl get secrets` and displays the following files:
 - **kubectl_get_secrets.out** file is the output of the command `get secrets` that lists the status of all services for Anyware Manager services.
 - The description of a secrets through the output of the command `kubectl describe secrets`.
 - The secrets information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.

Anyware Manager Health Status

In the case that there is an issue with Anyware Manager, the diagnose health command will provide an overview of Anyware Manager's health. The following command will provide a list of services that are in healthy and unhealthy state. The command will allow the user to determine the services that are unhealthy and run more specific diagnosis on the unhealthy service:

```
sudo /usr/local/bin/anyware-manager diagnose --health
```

Anyware Manager Proxy Configuration

When using a proxy, the diagnose health command could time out when trying to reach the vault. Add the vault IP address seen in the error to the no_proxy and NO_PROXY environment configuration.

The diagnose command lists all Anyware Manager services, but not all services are essential. The essential services for Anyware Manager are listed below. If any of these services are in an unhealthy state, the overall health status will be unhealthy:

- "activitylog"
- "activitylogconsumer"
- "authorization"
- "camadminconsolega"
- "connectors"
- "connectorsworker"
- "deploymentmgmt"
- "deploymentworker"
- "docs"
- "kafka"
- "machinmgmt"
- "machinmgmtdeleteworker"
- "machinmgmtworker"

- "machinemonitor"
- "machinemonitorworker"
- "poolmgmt"
- "poolmgmtworker"
- "secretmgmt"
- "redis"
- "resourcetemplates"
- "resourcetemplatestore"
- "userentitlement"
- "userentitlementworker"

Vault Issues

If you suddenly start getting errors when using Anyware Manager features, it is possible the Vault token used in your Anyware Manager deployment has expired. To diagnose, try the following options:

1. Run the following command to follow the logs for the secret management service:

```
kubectl logs -l app=secretmgmt -f
```

2. While streaming the secretmgmt logs, try logging in to Anyware Manager. If you see the following message in the logs, your Vault token may have expired:

```
{"message":"Permission denied","level":"error"}
```

3. To confirm that the Vault token has expired, run the following command in the location you have the Vault CLI installed:

```
vault token lookup <your Anyware Manager Vault token>
```

4. If you get the following message after running this command, then your Anyware Manager token has expired or become invalid:

```
Error looking up token: Error making API request.  
  
URL: POST https://<your Vault address>/v1/auth/token/lookup  
Code: 403. Errors:  
  
* bad token
```

To fix this issue, create a renewable token and update your Anyware Manager's Vault configuration to use that token. To avoid the Vault token from prematurely expiring again, follow the steps outlined [here](#) to set up automatic renewal for your Vault token.

Repository Management

Repository must be added correctly in order to install Anyware Manager or Anyware Connector from online. See **Add Anyware Manager Repository** section in the [Installing Anyware Manager - Default Configuration](#) topic to manage Anyware Manager repositories and see [Adding the Connector Repository](#) to manage Anyware Connector repositories.

Cases that repository is not setup properly and is causing installation fails:

- Case 1: Multiple `cas-manager*` or `anyware-manager` repositories are added:

If the server has multiple repositories beta or GA repos for `cas-manager` or `anyware-manager`, there could be a conflict of repositories. This can cause the installation to fail. To check the existing repository status, run the following command:

```
dnf repolist teradici-*-manager*
```

For Example: If you have beta or GA `cas-manager` repositories installed, the installer will display:

repo id	repo name	status
teradici-cas-manager	teradici-cas-manager	enabled
teradici-cas-manager-beta	teradici-cas-manager-beta	enabled
teradici-cas-manager-beta-noarch	teradici-cas-manager-beta-noarch	enabled
teradici-cas-manager-beta-source	teradici-cas-manager-beta-source	enabled
teradici-cas-manager-noarch	teradici-cas-manager-noarch	enabled
teradici-cas-manager-source	teradici-cas-manager-source	enabled

To solve the issue, make sure you only keep one of the repos that you want to install from. Run the following commands to remove unwanted repositories:

Run the following commands to remove unwanted repositories:

- To remove the stable `cas-manager` repo, run `sudo rm -rf /etc/yum.repos.d/teradici-cas-manager` command.
 - To remove the beta `cas-manager` repo, run `sudo rm -rf /etc/yum.repos.d/teradici-cas-manager-beta.repo` command.
 - To remove all the existing repos, run `sudo rm -rf /etc/yum.repos.d/teradici*` command.
- Case 2: An incorrect or no repository is added. If the repository list command above returns no repo or wrong repo name, you must run the add repo command to add correct repo before install.

Anyware Connector on Ubuntu

Anyware Connector Installer Issues

We moved to a new distribution system and on December 31, 2020 the legacy system was shut down. As a result of this change some errors may occur for users with Connectors that were installed from older installer versions.

In almost all cases downloading the latest installer version and running the `cloud-access-connector install`, `cloud-access-connector update` or `cloud-access-connector diagnose` commands with the new install should work.

Error Messages

The following are a list of potential error messages that a user may encounter as a result of the change of distribution system:

Attempting to download the installer

Error 1

```
user@vm:~$ mkdir ~/v2connector && cd ~/v2connector
user@vm:~/v2connector$ curl -LO https://teradici.bintray.com/cloud-access-connector/cloud-access-connector-0.1.1.tar.gz
% Total % Received % Xferd Average Speed Time Time Time Current
Dload Upload Total Spent Left Speed
100 41 0 41 0 0 141 0 --:--:-- --:--:-- --:--:-- 141
user@vm:~/v2connector$ tar xzvf cloud-access-connector-0.1.1.tar.gz

gzip: stdin: not in gzip format
tar: Child returned status 1
tar: Error is not recoverable: exiting now
```

Error 2

```

user@vm:~$ mkdir ~/v2connector && cd ~/v2connector
user@vm:~/v2connector$ curl -LO https://teradici.bintray.com/cloud-access-
connector/cloud-access-connector-0.1.1.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time
Current
                                 Dload  Upload  Total  Spent    Left  Speed
  0     0     0     0     0     0     0     0  --:--:--  --:--:--  --:--:--
0curl: (6) Could not resolve host: teradici.bintray.com

```

Running older installer versions

If the Connector installer was installed before December 11, it may generate some of the following errors:

Error 3

```

[2020-12-22T20:36:57Z] INFO Verifying installer version
[2020-12-22T20:36:57Z] ERROR yaml: unmarshal errors:
  line 1: cannot unmarshal !!str `The req...` into docker.ComposeConfig

```

Error 4

```

[2020-12-22T20:07:09Z] INFO Downloading compose file
[2020-12-22T20:07:09Z] INFO curl: (60) SSL certificate problem: self signed
certificate
[2020-12-22T20:07:09Z] INFO More details here: https://curl.haxx.se/docs/
sslcerts.html
[2020-12-22T20:07:09Z] INFO
[2020-12-22T20:07:09Z] INFO curl failed to verify the legitimacy of the
server and therefore could not
[2020-12-22T20:07:09Z] INFO establish a secure connection to it. To learn
more about this situation and
[2020-12-22T20:07:09Z] INFO how to fix it, please visit the web page
mentioned above.
[2020-12-22T20:07:09Z] ERROR exit status 60

```

Error 5

```
[2020-12-22T20:24:06Z] INFO Configuring Docker Daemon
[2020-12-22T20:24:06Z] INFO populateTrustAndKeyStore: Pulling setup container
and populating Java trust and key store
[2020-12-22T20:24:07Z] INFO Error response from daemon: error parsing HTTP
404 response body: invalid character '<' looking for beginning of value: "<!
doctype html><html lang=\"en\"><head><title>HTTP Status 404 - Not Found</
title><style type=\"text/css\">body {font-family:Tahoma,Arial,sans-serif;} h1,
h2, h3, b {color:white;background-color:#525D76;} h1 {font-size:22px;} h2
{font-size:16px;} h3 {font-size:14px;} p {font-size:12px;} a
{color:black;} .line {height:1px;background-color:#525D76;border:none;}</
style></head><body><h1>HTTP Status 404 - Not Found</h1><hr class=\"line\" /
><p><b>Type</b> Status Report</p><p><b>Description</b> The origin server did
not find a current representation for the target resource or is not willing to
disclose that one exists.</p><hr class=\"line\" /><h3>Apache Tomcat/8.5.59</
h3></body></html>"
[2020-12-22T20:24:07Z] ERROR exit status 1
```

Error 6

```
[2021-02-11T01:02:42Z] INFO Error response from daemon: Head https://teradici-
docker-registry.bintray.io/v2/diagnostics/manifests/stable: unauthorized:
Unauthorized
[2021-02-11T01:02:42Z] ERROR exit status 1
```

Anyware Connector Connectivity Issues

Anyware Manager provides some diagnostic checks that can be used to troubleshoot the cause of issues you may be experiencing with your Connector. Run the following command:

```
cd /usr/sbin
sudo ./cloud-access-connector diagnose
```

Please note that older installs and updates may still be in the legacy directory at `~/v2connector`.

This command can also be used to verify that your Connector has been correctly configured. The diagnostic checks cover Remote Workstation connectivity and Active Directory connectivity.

The following table lists the flags associated with this command:

Flag	Description
<code>--rw</code>	The Remote Workstation FQDN
<code>--ad</code>	Verify connectivity to currently configured Active Directory server
<code>-h --</code> <code>help</code>	help for diagnose
<code>--</code> <code>debug</code>	This flag can be run if you initial install of the Connector fails. It provides a detailed output of the Connector installation. This is useful for self-troubleshooting or to provide to the HP support team when logging a support ticket.

Common Installation Issues with the Connector

For information on issues relating to failed Connector installations, We have a KB article that details troubleshooting steps for common issues related to installing the Connector, see [here](#).

⚠ Connector Upgrade and Diagnose Issues

Several previous versions of Connector installers are no longer compatible with our latest infrastructure upgrades. When you run the configure or diagnose commands with these older versions you may receive errors such as "Error response from daemon: GET <https://docker.cloudsmith.io/.....: unauthorized>" for example. If this occurs you need to download the latest version of the Connector installer from [here](#).

✍ Running Diagnose command does not impact the active sessions.

Remote Workstation Connectivity Check

This command will attempt to connect to the specified remote workstation on the ports required for establishing a PCoIP session. It checks to ensure that the PCoIP Agent is running on the remote workstation.

Example command to diagnose remote workstation connectivity issues:

```
sudo ./cloud-access-connector diagnose --rw fqdn.of.my.rw
```

Check Passes

- Your Connector is able to resolve the FQDN of the remote workstation and connect to it.
- The PCoIP Agent is running and responding on the remote workstation.

Check Fails

If the check fails it may be as a result of one or more of the following issues:

- Firewall or network routing rules or restrictions may be in place.
- A failure has occurred and the FQDN of the remote workstation cannot be resolved.
- The PCoIP Agent on the remote workstation is not running or is unresponsive.

Active Directory Connectivity Check

This command will attempt to connect to the Active Directory domain controller that was provided during installation using those same credentials.

Example command to diagnose Active Directory connectivity issues:

```
sudo ./cloud-access-connector diagnose --ad
```

Check Passes

- The Connector is able to resolve the FQDN of the domain controller and authenticate to it.

Check Fails

If the check fails it may be as a result of one or more of the following issues:

- Firewall or network routing rules or restrictions may be in place.
- A failure has occurred and the FQDN of the domain controller cannot be resolved.
- The Active Directory server may be unresponsive.
- The check was unable to authenticate to the Active Directory server.

Anyware Connector Log Collection

The following section outlines how to view the logs and view the status of the Anyware Connector services and installer. This information can help troubleshoot issues relating to the Connector.

To view the status of all services in the Connector run the following command:

```
sudo docker service ls
```

To get logs from services run the following command:

```
sudo docker service logs [service]
```

The following list details the important services:

- `connector_activedirectorysync`
- `connector_brokerexternal`
- `connector_brokerinternal`
- `connector_cm`
- `connector_cmsg`
- `connector_connectorgateway`
- `connector_healthcheck`
- `connector_managementinterface`
- `connector_sumologic`

The installer and update logs are saved for the installer in `/var/log/cloud-access-connector/`.

Retrieving Anyware Connector Version Numbers

Understanding the version number of a Connector can be useful when troubleshooting issues and to ensure you are running the latest version of the Connector. The Connector, from version 67 on, has a single version number. Previously, the installer and connector version numbers were different. These have now been combined to display a single version number going forward.

Connector Installer Version

The installer is used for installing, updating and diagnosing issues related to the Connector installation process. It can be updated at the same time as the Connector, and also updated independent of the Connector as updates are made to improve installation specific areas. A change in the version of the installer does not require an upgrade to the Connector itself.

If you have downloaded the Connector installer you can obtain the version number by running one of the following commands (depending on where it has been copied to):

```
./cloud-access-connector --version
```

or

```
/usr/sbin/cloud-access-connector --version
```

A successful response is outlined below:

```
cloud-access-connector v66.0.63_9606001760
```

The first command should be used if you are currently in the same directory as the installer. This is more common for older versions of the installer. The second command is the location where newer versions of the installer have been copied to.

The Connector installer version also appears at the top of the output when you run an installation:

```
user@vm:~$ sudo /usr/sbin/cloud-access-connector install
[2021-02-03T17:16:01Z] INFO Set docker registry as: docker.cloudsmith.io/
teradici/cloud-access-connector
[2021-02-03T17:16:01Z] INFO Starting cloud-access-connector
version=v66.0.63_9606001760
...
```

It will also be logged by the installer:

```
user@vm:/var/log$ sudo more /var/log/cloud-access-connector/
install_2021-02-03T17-16-01.log
time="2021-02-03T17:16:01Z" level=info msg="Starting cloud-access-connector"
version=v66.0.63_9606001760
time="2021-02-03T17:17:14Z" level=error msg="You must accept the EULA and
Privacy Policy to continue."
...
```

You can also view the Connector installer version number from the [HP download](#) site when viewing the download filename.

Connector Version

The Connector version, sometimes referred to as the YAML or compose file, denotes the combination of containers that make up a particular release of the Connector. The primary location to view the version of your running Connector is from the [Connectors page](#) in the Admin Console.

This version number represents a combination of specific versions of services that run on the Connector. For example, version 42 of the Connector includes the PCoIP Connection Manager 21.01.0. When troubleshooting issues, this version is used by HP's support team to inform them as to which version of each service is running on your Connector.

Legacy Connector Versions

You should ensure that you keep this version as up to date as possible. We are continuously enhancing, adding features, fixing bugs and improving the overall security of the Connector. If you have a version that is v38 or lower, you should update your Connector as previous versions were integrated with an installer that predates our current Connector download location, and further installs or updates from that legacy installer may not work correctly.

If you are unable to access the Admin Console, you can obtain the version of the Connector from the configuration file itself, as outlined in the below example:

```
user@vm:/var/log$ cat /var/local/teradici/docker-compose.yaml | grep
CACV2_VERSION
  CACV2_VERSION: 42
```

DNS Name Resolution Configuration on Ubuntu

CONFIGURING A DNS NAME RESOLUTION

The first step to configuring the Connector is to ensure that there is a solid connection between the Connector and the Active Directory Domain Controller. You need to ensure that you can route from this machine to the Domain Controller and that there is nothing to prevent port 443 (https) and port 636 (LDAPS) connecting between the two systems.

In the following example the IP of the Domain Controller is 10.162.0.42.

.yaml format file

In step 4 below this is a .yaml format file and the whitespaces are critical. Tabs cannot be used in a .yaml file. Please format it exactly as it is displayed in the above example.

1. Install Resolvconf

```
sudo apt update
sudo apt install resolvconf
```

2. Edit the resolvconf file

```
Dynamic resolv.conf(5) file for glibc resolver(3) generated by
resolvconf(8)
DO NOT EDIT THIS FILE BY HAND -- YOUR CHANGES WILL BE OVERWRITTEN
127.0.0.53 is the systemd-resolved stub resolver.
run "systemd-resolve --status" to see details about the actual nameservers.
search teradici.local
nameserver 10.162.0.42
```

3. Restart the resolvconf service

```
sudo service resolvconf restart
```

4. Edit Netplan Config

```
sudo nano /etc/netplan/50-cloud-init.yaml
This file is generated from information provided by the datasource. Changes
to it will not persist across an instance reboot. To disable cloud-init's
network configuration capabilities, write a file
/etc/cloud/cloud.cfg.d/99-disable-network-config.cfg with the following:
network: {config: disabled}
network:
ethernets:
ens4:
  dhcp4: true
match:
  macaddress: 42:01:0a:a2:00:29
  set-name: ens4
nameservers:
  search: [teradici.local]
  addresses: [10.162.0.42]
version: 2
```

5. Restart Netplan

```
sudo netplan apply
```

6. Test DNS

```
ping <name-of-domain-controller>
```

7. If the response is successful, you should receive a message similar to the example below:

```
PING example.com (172.217.14.206): 56 data bytes
64 bytes from 172.217.14.206: icmp_seq=0 ttl=118 time=16.622 ms
64 bytes from 172.217.14.206: icmp_seq=1 ttl=118 time=50.675 ms
64 bytes from 172.217.14.206: icmp_seq=2 ttl=118 time=27.682 ms
64 bytes from 172.217.14.206: icmp_seq=3 ttl=118 time=19.886 ms
^C
--- example.com ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
```

Anyware Connector on RHEL/Rocky Linux

Anyware Connector Support Bundle on RHEL/Rocky Linux

If you encounter an issue with the Anyware Connector on RHEL/Rocky Linux, it is possible to generate a support bundle that can be sent to the HP support team to investigate and resolve.

To generate the support bundle, run the following command:

```
sudo /usr/local/bin/anyware-connector diagnose --support-bundle
```

If this command is successful, a tar.gz file will be located under the `/tmp/` directory with a name formatted as follows:

`/tmp/anyware-connector-support-bundle-(date)-(time).tar.gz`

Support Bundle Information and Logs

The support bundle collects the various information from the system and then zip the files into a `.tar.gz` file in the `/tmp` directory.

Once you unzip the file the structure is as follows:

- **files/etc** folder contains files with OS level information:
 - **issue** file contains a copy of all contents from the `/etc/issue` file.
 - **os-release** file contains all operating system identification data that was found in the `/usr/lib/os-release` file.
 - ****systemd/system/k3s.service**** folder contains the information about `k3s.service` configuration.
- **files/var/log/anyware-connector** folder collects all of the Anyware Connector log files, for example generate, configure, diagnose, install logs.

The **out** folder collects outputs from running various commands to expose the details of relevant system information and Anyware Connector backend services, as outlined below:

- **os** folder contains the following files:
 - **dmesg.out** file contains the output of command `dmesg`.

- **ls_l@var@crash.out** file contains the output of the command `ls -l /var/crash`.
- **pgrep_l_k3s.out** file contains the output of the command `pgrep -l k3s`.
- **ps_wwauxfx.out** file contains the output of the command `ps wwauxfZ`.
- **ss-aux.out** file contains the output of the command `ss -ax`.
- **who.out** file contains the output of the command `who`.
- **dnf_list_--installed_--disablerepo=*.out** file contains the packages that are currently installed on the system and their versions.
- The **firewall** folder contains the outputs of the command `firewall-cmd --list-services`.
- The **network** folder displays the following network files:
 - **netstat_Wnap.out** file contains the output of the command `netstat -Wnap`.
 - **ip_add.out** file contains the output of the command `ip add`.
 - **selinux** folder contains the following files:
 - **semodule_l.out** file contains the output of the command `semodule -l`.
 - **sestatus.out** file contains the output of the command `sestatus`.
- The **deployments** folder contains the following files:
 - **kubectl_get_deployment.out** file is the output of the command `kubectl get deployments` that lists the status of all deployments for Anyware Connector services.
 - The description of the deployment for each of the deployments through the output of the command `kubectl describe`.
 - The deployments information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- The **Pods** folder contains the following files:
 - **kubectl_get_pods.out** file is the output of the command `get pods` that lists the status of all pods for Anyware Connector services.
 - The description of a pod for each of the pods through the output of the command `kubectl describe pod`
 - The pod information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- **logs** folder contains the following files:
 - The log files for each pod.

- The logs files are retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- The **services** folder contains the following files:
 - **kubectl_get_services.out** file is the output of the command `get services` that lists the status of all services for Anyware Connector services.
 - The description of a service for each of the services through the output of the command `kubectl describe services`
 - The services information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.
- **secrets** folder displays the output of the command `kubectl get secrets` and displays the following files:
 - **kubectl_get_secrets.out** file is the output of the command `get secrets` that lists the status of all services for Anyware Connector services.
 - The description of a secrets through the output of the command `kubectl describe secrets`.
 - The secrets information is retrieved from the following namespaces: `kube-system`, `kube-public`, `kube-node-lease`, `connector`, `logging`, and `ingress-nginx`.

Anyware Connector Health Status on RHEL/Rocky Linux

 **Running Diagnose command does not impact the active sessions.**

In the case that there is an issue with the Connector on RHEL/Rocky Linux, the diagnose health command will provide an overview of Connector's health. The following command will provide a list of services that are in healthy and unhealthy states. The command will enable you to determine the services that are unhealthy and run more specific diagnosis on the unhealthy service:

```
sudo /usr/local/bin/anyware-connector diagnose --health
```

The diagnose command lists all Connector service, these services for the Connector are listed below. If any of these services are in an unhealthy state, the overall health status will be unhealthy:

- "adsync"
- "broker"
- "cm"
- "cmsg"
- "sg"
- "healthcheck"
- "rwtelemetry"

Network Connectivity Issues

The Anyware Connector provides some diagnostic checks that can be used to troubleshoot the cause of issues you may be experiencing. Run the following command:

```
sudo /usr/local/bin/anyware-connector diagnose
```

This command can also be used to verify that your Connector has been correctly configured. The diagnostic checks cover Remote Workstation connectivity and Active Directory connectivity.

The following table lists the flags associated with this command:

Flag	Description
<code>--rw</code>	The Remote Workstation FQDN
<code>--ad</code>	Verify connectivity to currently configured Active Directory server
<code>-h --help</code>	help for diagnose
<code>--debug</code>	This flag can be run if you initial install of the Connector fails. It provides a detailed output of the Connector installation. This is useful for self-troubleshooting or to provide to the HP support team when logging a support ticket.

Common Installation Issues with the Connector

For information on issues relating to failed Connector installations, We have a KB article that details troubleshooting steps for common issues related to installing the Connector, see [here](#).

Remote Workstation Connectivity Check

This command will attempt to connect to the specified remote workstation on the ports required for establishing a PCoIP session. It checks to ensure that the PCoIP agent is running on the remote workstation.

Example command to diagnose remote workstation connectivity issues:

```
sudo /usr/local/bin/anyware-connector diagnose --rw fqdn.of.my.rw
```

Check Passes

- Your Connector is able to resolve the FQDN of the remote workstation and connect to it.
- The PCoIP agent is running and responding on the remote workstation.

Check Fails

If the check fails it may be as a result of one or more of the following issues:

- Firewall or network routing rules or restrictions may be in place.
- A failure has occurred and the FQDN of the remote workstation cannot be resolved.
- The PCoIP agent on the remote workstation is not running or is unresponsive.
- There may be an issue with the DNS name. For more information on this, and how to potentially resolve this issue, see [DNS Name Resolution Configuration on RHEL/Rocky Linux](#).

Active Directory Connectivity Check

This command will attempt to connect to the Active Directory domain controller that was provided during installation using those same credentials.

Example command to diagnose Active Directory connectivity issues:

```
sudo /usr/local/bin/anyware-connector diagnose --ad
```

Check Passes

- The Connector is able to resolve the FQDN of the domain controller and authenticate to it.

Check Fails

If the check fails it may be as a result of one or more of the following issues:

- Firewall or network routing rules or restrictions may be in place.
- A failure has occurred and the FQDN of the domain controller cannot be resolved.
- The Active Directory server may be unresponsive.
- The check was unable to authenticate to the Active Directory server.
- There may be an issue with the DNS name. For more information on this, and how to potentially resolve this issue, see [DNS Name Resolution Configuration on RHEL/Rocky Linux](#).

Configuring DNS Name Resolution

In order to install and configure Anyware Manager or Connector on the RHEL or Rocky Linux machine, it's important to ensure that there is a solid connection between the machine and the Active Directory Domain Controller. You need to ensure that you can route from this machine to the Domain Controller and that there is nothing to prevent port 443 (https) and port 636 (LDAPS) connecting between the two systems.

The following steps are to ensure DNS settings are configured properly on the machine for Anyware Manager or Connector to operate. The sample IP of the Domain Controller is `10.162.0.42` for `example-domain.com`:

1. Disable auto-configuration of DNS settings in order to prevent setting being overwritten on reboot. In this example the device name is `eth0`:

```
nmcli device modify eth0 ipv4.ignore-auto-dns yes
```

You may also need to disable this on the connection level in some cases. In this example the connection name is `eth0`:

```
nmcli connection modify eth0 ipv4.ignore-auto-dns yes
```

2. Edit the Network Configuration scripts. Add the `DNS1` for the IP address for Active Directory's DNS server (typically the Domain Controller itself) and optionally `DNS2` for the fallback DNS server. You can optionally add `DOMAIN` for a DNS suffix (typically the Domain name):

```
sudo vi /etc/sysconfig/network-scripts/ifcfg-eth0
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=dhcp
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
NAME=ens192
UUID=dfe16427-21f1-429c-99cb-a1e9b42be181
DEVICE=ens192
ONBOOT=yes
DNS1=10.162.0.42
DOMAIN=example-domain.com
PEERDNS=no
```

3. Run the following command to restart the Network Manager:

```
sudo systemctl restart NetworkManager
```

4. Check the `/etc/resolv.conf` file to make sure that the desired DNS servers and search suffixes are there. It is important the the `nameservers` are the AD DNS or else the machine will fail to connect to the Domain Controller(s):

```
cat /etc/resolv.conf
# Generated by NetworkManager
search example-domain.com
nameserver 10.162.0.42
```

5. Test DNS by pinging the domain, in this example `example-domain.com` is the domain name:

```
ping example-domain.com
```

6. If the response is successful, you should receive a message similar to the example below:

```
PING example-domain.com (10.162.0.42): 56 data bytes
64 bytes from 10.162.0.42: icmp_seq=0 ttl=118 time=16.622 ms
64 bytes from 10.162.0.42: icmp_seq=1 ttl=118 time=50.675 ms
64 bytes from 10.162.0.42: icmp_seq=2 ttl=118 time=27.682 ms
64 bytes from 10.162.0.42: icmp_seq=3 ttl=118 time=19.886 ms
^C
--- example-domain.com ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
```

7. Reboot the machine and check that the DNS settings in `/etc/resolv.conf` persist and that you can still ping the domain as done in steps 4-6.

Applying Host Machines DNS settings to K3S

The host machine's DNS settings are copied from `/etc/resolv.conf` and applied to the Anyware Manager and/or CAS Connector when the CAS K3S service starts. Because of this it is important that settings are correct on boot. You will need to either reboot the machine or restart the K3S service to apply the DNS settings to the Anyware Manager or CAS Connector if changes are made post installation or configuration.

It is best to ensure DNS settings are correct before installing and CAS software on the machine.

Logging

Adding a Sumo Logic Log Collector

The following section details how to add a Sumo Logic log collector to Anyware Manager. For information on Sumo Logic, see [here](#). In order to add the log collector you must have a Anyware Managers instance, and a Sumo Logic account that has the permissions levels required to create log collectors.

1. SSH to the Anyware Manager host and create the Sumo Logic configuration file:

```
cd ~  
vim sources.json
```

2. Paste in the following information:

```
{
  "api.version": "v1",
  "sources": [
    {
      "name": "test", # <<< Replace this with your own or leave it as is
      "category": "manager/test", # <<< Replace this with your own
category or leave it as is
      "automaticDateParsing": true,
      "multilineProcessingEnabled": false,
      "useAutolineMatching": false,
      "forceTimeZone": false,
      "timeZone": "Etc/UTC",
      "filters": [
        ],
      "cutoffTimestamp": 0,
      "encoding": "UTF-8",
      "pathExpression": "/var/log/containers/*.log", # <<< this tells
sumologic which file patterns to ingest. We only care about the logs. Leave
this as is.
      "blacklist": [
        ],
      "sourceType": "LocalFile",
      "alive": false
    }
  ]
}
```

3. Download the Sumo Logic Collector:

```
curl "https://collectors.sumologic.com/rest/download/linux/64" -o
SumoCollector.sh
sudo chmod +x SumoCollector.sh
```

4. Install the Sumo Logic Collector. For more information on installing the Sumo Collector, see [here](#).

Once you have access to the Anyware Manager host, you need to perform one of the following:

- **Installation using an installation token**

Installation tokens can be created by going to **Administration>Security>Installation Tokens** in the Sumo Logic web app and adding a token. Once you have completed this, run the following command:

```
sudo ./SumoCollector.sh -q -Vsumo.token_and_url=<Your-Installation-Token> -  
VsyncSources=/path/to/sources.json
```

• Installation using an access key

Access keys can be created by going to the **Preferences** page in the Sumo Logic web app and adding an Access key. You will then be able to copy the accessID and accessKey. Once you have completed this, run the following command:

```
sudo ./SumoCollector.sh -q -Vsumo.accessid=<accessid> -Vsumo.accesskey=<accesskey> -  
VsyncSources=/path/to/sources.json
```

Once you have the Sumo Logic collector installed, you can log into Sumo Logic and access the logs for this collector.

Getting Support

If you are having trouble, help is available. This section contains information about contacting HP support and connecting with the HP user community.

Contacting Support

If you encounter problems installing or using HP technology, you can:

- Browse the [HP Knowledge Base](#).
- Submit a [Support Ticket](#).

The HP Community Forum

The PCoIP Community Forum allows users to have conversations with other IT professionals to learn how they resolved issues, find answers to common questions, have peer group discussions on various topics, and access the HP PCoIP Technical Support Service team. Our staff is heavily involved in the forums.

To join the HP community, visit the [HP Knowledge Center](#).

Release Notes

To view the latest release notes for Anyware Manager, see [Anyware Manager Release Notes](#).