

# Installing and Configuring VMware Cloud Director Object Storage Extension with VMware Cloud Director Service

24 FEB 2022

VMware Cloud Director Object Storage Extension 2.1.1

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<https://docs.vmware.com/>

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# Installing and Configuring VMware Cloud Director Object Storage Extension with VMware Cloud Director Service

This document provides information about installing the VMware Cloud Director™ Object Storage Extension™ software and configuring it to work with VMware Cloud Director™ service and VMware Cloud™ on AWS.

## Intended Audience

The document is intended for anyone who wants to install and configure VMware Cloud Director Object Storage Extension with VMware Cloud Director service.

# What Is VMware Cloud Director Object Storage Extension with VMware Cloud Director Service

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You can configure VMware Cloud Director Object Storage Extension with VMware Cloud Director service that runs on VMware Cloud on AWS.

## What is VMware Cloud on AWS

VMware Cloud on AWS is an integrated cloud offering jointly developed by Amazon Web Services (AWS) and VMware. With VMware Cloud on AWS, you can deliver highly scalable and secure services by migrating and extending your on-premises VMware vSphere-based environments to the AWS Cloud running on Amazon Elastic Compute Cloud (Amazon EC2). For more information, see <https://docs.vmware.com/en/VMware-Cloud-on-AWS/index.html>.

## What Is VMware Cloud Director Service

VMware Cloud Director service is a cloud-service application that uses the underlying infrastructure of VMware Cloud on AWS.

With VMware Cloud Director service, cloud providers can deliver virtual infrastructure resources in a multitenant cloud environment.

For more information, see <https://docs.vmware.com/en/VMware-Cloud-Director-service/index.html>.

## What Is VMware Cloud Director Object Storage Extension with VMware Cloud Director Service

You can configure VMware Cloud Director Object Storage Extension to work with VMware Cloud Director service and provide native AWS S3 object storage capabilities to tenant users of VMware Cloud Director.

## Roles and Rights in VMware Cloud Director Object Storage Extension

Any user with an account that is activated from the VMware Cloud Director perspective can access VMware Cloud Director Object Storage Extension.

The items you see and the actions you can perform depend on the rights assigned to your user profile within a VMware Cloud Director organization.

The rights assigned to your user profile in VMware Cloud Director define your user role in VMware Cloud Director Object Storage Extension.

The following table contains the mapping between VMware Cloud Director rights and VMware Cloud Director Object Storage Extension roles.

# Installation and Configuration Requirements

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Before you start installing and configuring VMware Cloud Director Object Storage Extension with VMware Cloud Director service, verify that your cloud environment meets the requirements.

VMware Cloud Director Object Storage Extension supports a list of Linux distributions and versions:

- CentOS Linux 8
- CentOS Linux 7
- Red Hat Enterprise Linux 7 and later
- Oracle Linux 7 and later

To run VMware Cloud Director Object Storage Extension on a virtual machine, install Java JRE 8 or later.

## Database Requirements

VMware Cloud Director Object Storage Extension requires a dedicated database instance and a database user that has sufficient privileges to create tables and change database schemas.

VMware Cloud Director Object Storage Extension supports PostgreSQL version 10 or later.

You can configure VMware Cloud Director Object Storage Extension with a VM-based PostgreSQL or an RDS-based PostgreSQL on AWS.

## Network Port Requirements

Ensure that the required network ports are open for the VMware Cloud Director Object Storage Extension services communication. The following table lists the ports that must allow outgoing packets from VMware Cloud Director Object Storage Extension.

Source	Destination	Port	Protocol	Description
VMware Cloud Director Object Storage Extension	AWS S3	443	TCP, UDP	Used for communication between VMware Cloud Director Object Storage Extension and AWS S3 services.
VMware Cloud Director Object Storage Extension	Database VM	1433, 5432	Postgres	Used for database requests.
VMware Cloud Director Object Storage Extension	VMware Cloud Director service instance	443	TCP, UDP	Used for authentication requests and requests communication.

## Deployment Types and Hardware Requirements

Depending on your scale and your deployment goals, you can choose between various deployment types. The following table describes the deployment types and their hardware requirements.

Deployment Type	What to do?	VMware Cloud Director Object Storage Extension Hardware Requirements
Small	Deploy a virtual storage appliance to your compute cluster. The compute cluster is where your tenant workloads are running. Deploy VMware Cloud Director Object Storage Extension to your management cluster. The management cluster is where your VMware Cloud Director cells are running.	<ul style="list-style-type: none"> <li>■ 4 Core CPU</li> <li>■ 8GB RAM</li> <li>■ 120 GB free disk space</li> </ul>
Medium	Deploy a virtual storage appliance to a dedicated ESXi host with large local disks. Deploy VMware Cloud Director Object Storage Extension to your management cluster. The management cluster is where your VMware Cloud Director cells are running.	<ul style="list-style-type: none"> <li>■ 8 Core CPU</li> <li>■ 8 GB RAM</li> <li>■ 120 GB Free Disk Space</li> </ul>
Large	Configure storage platform services on a supported physical appliance. Deploy VMware Cloud Director Object Storage Extension to your management cluster. The management cluster is where your VMware Cloud Director cells are running.	<ul style="list-style-type: none"> <li>■ 12 Core CPU</li> <li>■ 12 GB RAM</li> <li>■ 120 GB Free Disk Space</li> </ul>

## VMware Cloud on AWS Requirements

Ensure that your VMware Cloud on AWS environment meets the following requirements.

- Deploy a software-defined data center and connect an AWS account. See [Deploying and Managing a Software-Defined Data Center](#).
- Connect to an instance of vCenter Server. See [Connect to vCenter Server](#).

- Deploy a virtual machine to host VMware Cloud Director Object Storage Extension services. See [Deploy Workload VMs](#).
- Allow access to the Internet for the virtual machine. Ensure that the Internet Access rule is set to allowed in the compute gateway of the gateway firewall.
- Assign a public IP address to the virtual machine. See [Assign a Public IP address to a VM](#).
- To create a mapping between the internal and public IP addresses of the virtual machine, create a NAT rule. See [Create or Modify NAT Rules](#).
- To lower operational costs, configure a gateway endpoint for AWS S3. See [Access an S3 Bucket Using an S3 Endpoint](#).

For more information about VMware Cloud on AWS, see [VMware Cloud on AWS Documentation](#).

## VMware Cloud Director Service Requirements

Ensure that your VMware Cloud Director service environment meets the following requirements.

- Create a VMware Cloud Director instance. See [How Do I Create a VMware Cloud Director Instance](#).
- Associate the VMware Cloud Director instance with the software-defined data center in VMware Cloud on AWS. See [How Do I Associate My VMware Cloud Director Instance with a VMware Cloud on AWS SDDC](#).
- In VMware Cloud on AWS, verify that you have added the gateway firewall rules for your VMware Cloud Director service.

For more information about VMware Cloud Director service, see <https://docs.vmware.com/en/VMware-Cloud-Director-service/index.html>.

## Requirements for Virtual Hosted-Style S3 API Request

When you make an S3 API request, you can use path-style URI, for example, `https://<ose-host>/api/v1/s3/<bucket>/<object>`, or you can use the virtual hosted-style URI, for example, `https://<bucket>.<s3-ose-host>/<object>`.

To support virtual hosted-style S3 API requests, make sure the hostname of your VMware Cloud Director Object Storage Extension instance starts with `s3.` and that your DNS server can route virtual hosted-style requests.

For example, the hostname of your VMware Cloud Director Object Storage Extension instance is *example.com*. To route virtual hosted-style requests, add the following hostname mapping to DNS entries:

From	To
*.s3.example.com	example.com
s3.example.com	example.com

# Installing and Configuring VMware Cloud Director Object Storage Extension

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You install VMware Cloud Director Object Storage Extension on a Linux operating system.

The VMware Cloud Director Object Storage Extension installation and configuration consist of deploying and configuring not only the VMware Cloud Director Object Storage Extension services, but also of configuring all external components to work with VMware Cloud Director Object Storage Extension.

For scaling purposes, you can deploy and configure multiple instances of VMware Cloud Director Object Storage Extension behind a load balancer.

Following is a list of the steps you take to install and configure VMware Cloud Director Object Storage Extension:

- 1 Install the VMware Cloud Director Object Storage Extension installation package.
- 2 Import an externally signed SSL certificate to VMware Cloud Director Object Storage Extension.
- 3 Connect to a preconfigured database.
- 4 Connect to an instance of VMware Cloud Director.
- 5 Install the VMware Cloud Director Object Storage Extension user interface.
- 6 Start the Kubernetes Backup and Restore service.
- 7 Configure the connection to AWS.

This chapter includes the following topics:

- [VMware Cloud Director Object Storage Extension Command-Line Interface Reference](#)
- [Install VMware Cloud Director Object Storage Extension](#)
- [Configure VMware Cloud Director Object Storage Extension with AWS](#)

## VMware Cloud Director Object Storage Extension Command-Line Interface Reference

The following table describes the `ose` command-line interface scripts.

Script	Description
<code>ose</code>	Returns details about the <code>ose</code> command-line utility.
<code>ose --version</code>	Returns the version of VMware Cloud Director Object Storage Extension that you run.
<code>ose show</code>	Returns all VMware Cloud Director Object Storage Extension configuration details. You can optionally add the <code>--with-secret</code> argument and the system returns the passwords that you set during installation and configuration.
<b>SSL Certificate Management Scripts</b>	
<code>ose cert gen</code>	Generates a new self-signed SSL certificate for the VMware Cloud Director Object Storage Extension service. The <code>--cn</code> and <code>--secret</code> arguments are required. The <code>--cn</code> argument value, must be the common name of the VMware Cloud Director Object Storage Extension host. The <code>--secret</code> argument value must be the password of the keystore.
<code>ose cert import</code>	Imports an externally signed SSL certificate. The <code>--path</code> and <code>--secret</code> arguments are required. The <code>--path</code> argument value must be the full path to the <code>.p12</code> certificate file. The <code>--secret</code> argument value must be the password of the keystore. You can optionally add the <code>--force</code> argument to avoid the password validation.
<code>ose cert show</code>	Returns details about the SSL certificate that VMware Cloud Director Object Storage Extension uses. You can optionally add the <code>--with-secret</code> argument to get the password of the keystore.
<b>Database Configuration Scripts</b>	
<code>ose db set</code>	Configures a connection between your database instance and VMware Cloud Director Object Storage Extension. The <code>--url</code> , <code>--user</code> , and <code>--secret</code> arguments are required. The <code>--url</code> argument value must be the URL of your database instance. The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of the database user. You can optionally add the <code>--force</code> argument to avoid the password validation.
<code>ose db show</code>	Returns details about the database configuration. You can optionally add the <code>--with-secret</code> argument to get the password of the database user.
<b>VMware Cloud Director Configuration Scripts</b>	

Script	Description
<code>ose director set</code>	<p>Configures a connection between VMware Cloud Director and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--url</code>, <code>--user</code>, and <code>--secret</code> arguments are required.</p> <p>The <code>--url</code> argument value must be the URL of your VMware Cloud Director instance.</p> <p>The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of a VMware Cloud Director system administrator.</p> <p>You can optionally add the <code>--force</code> argument to avoid the password validation.</p>
<code>ose director show</code>	<p>Returns details about the VMware Cloud Director configuration.</p> <p>You can optionally add the <code>--with-secret</code> argument to get the password of the VMware Cloud Director user account.</p>
<code>ose ui install</code>	<p>Installs the VMware Cloud Director Object Storage Extension user interface plug-in for VMware Cloud Director.</p> <p>The <code>--ose-url</code> argument is required and the argument value must be the public server endpoint of VMware Cloud Director Object Storage Extension.</p>
<code>ose ui uninstall</code>	Uninstalls the VMware Cloud Director Object Storage Extension user interface plug-in for VMware Cloud Director.
<code>ose ui show</code>	Returns details about the configuration of the VMware Cloud Director Object Storage Extension user interface plug-in for VMware Cloud Director.
<b>Storage Platform Configuration Scripts</b>	
<code>ose platforms enable</code>	<p>Allows VMware Cloud Director Object Storage Extension to work with either Cloudian or ECS storage platforms.</p> <p>To activate the Cloudian storage platform, run the <code>ose platforms enable cloudian</code> script.</p> <p>To activate the ECS storage platform, run the <code>ose platforms enable ecs</code> script.</p> <p>To activate the AWS S3 storage service, run the <code>ose platforms enable amazon</code> script.</p> <p>To activate the Object Storage Interoperability Service, run the <code>ose platforms enable osis</code> script. The <code>--name</code> argument is required and defines a unique name for the Object Storage Interoperability Service instance.</p>
<code>ose platforms show</code>	Returns details about the platform that is configured for use in VMware Cloud Director Object Storage Extension.
<b>AWS S3 Configuration Scripts</b>	
<code>ose amazon set</code>	<p>Configures the connection to AWS S3.</p> <p>The <code>--region</code>, <code>--access-key</code>, and <code>--secret-key</code> arguments are required.</p> <p>The <code>--region</code> argument value must be the region of the AWS payer account.</p> <p>The <code>--access-key</code> and <code>--secret-key</code> values must be the access and secret keys of the AWS payer account.</p>

Script	Description
<code>ose amazon show</code>	Returns details about the AWS S3 configuration. You can optionally add the <code>--with-secret</code> argument to get the secret key of the AWS payer account.
<b>Cloudian Configuration Scripts</b>	
<code>ose cloudian admin set</code>	Configures a connection between the Cloudian Admin service and VMware Cloud Director Object Storage Extension. The <code>--url</code> , <code>--user</code> , and <code>--secret</code> arguments are required. The <code>--url</code> argument value must be the URL of the Cloudian Admin service. The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of a Cloudian Admin service administrator user. You can optionally add the <code>--force</code> argument to avoid the password validation.
<code>ose cloudian s3 set</code>	Configures a connection between the Cloudian S3 service and VMware Cloud Director Object Storage Extension. The <code>--url</code> argument is required and the value must be the FQDN or the IP address of the S3 service. If you use the FQDN, make sure that you correctly configure the S3 Service domain in the Cloudian HyperStore cluster. Also, make sure that your DNS server can route all bucket requests from the virtual to the actual S3 Service host. For example, from <i>bucket-name.hyper-store-s3-host</i> to <i>hyper-store-s3-host</i> . If you use the IP address of the S3 Service, no domain and virtual host route settings are required.
<code>ose cloudian iam set</code>	Configures a connection between the Cloudian IAM service and VMware Cloud Director Object Storage Extension. The <code>--url</code> argument is required and the value must be the URL of the Cloudian IAM service.
<code>ose cloudian console set</code>	Configures the connection between the Cloudian Management Console and VMware Cloud Director Object Storage Extension. The <code>--url</code> , <code>--user</code> , and <code>--secret</code> arguments are required. The <code>--url</code> argument value must be the URL of the Cloudian Management Console. The <code>--user</code> argument value must be the user name of a Cloudian system administrator. The <code>--secret</code> argument value must be the single sign-on shared key that is configured in the Cloudian Management Console. You can optionally add the <code>--force</code> argument to avoid the password validation.
<code>ose cloudian show</code>	Returns details about the configuration of Cloudian components. You can optionally add the <code>--with-secret</code> argument to get the passwords of the Cloudian user accounts.
<b>ECS Configuration Scripts</b>	

Script	Description
<code>ose ecs admin set</code>	<p>Configures a connection between the ECS Admin service and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--url</code>, <code>--user</code>, and <code>--secret</code> arguments are required.</p> <p>The <code>--url</code> argument value must be the URL of the ECS Admin service.</p> <p>The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of an ECS Admin service administrator user.</p> <p>You can optionally add the <code>--force</code> argument to avoid the password validation.</p>
<code>ose ecs s3 set</code>	<p>Configures a connection between the ECS S3 service and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--url</code> argument is required.</p> <p>The argument value must be the FQDN or the IP address of the S3 service.</p> <p>Make sure that your DNS server can route all bucket requests from the virtual to the actual S3 service host. For example, from <i>bucket-name.hyper-store-s3-host</i> to <i>hyper-store-s3-host</i>. If you use the IP address of the S3 service, no domain and virtual host route settings are required.</p>
<code>ose ecs console set</code>	<p>Configures a connection between the ECS Management Console and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--url</code>, <code>--user</code>, and <code>--secret</code> arguments are required.</p> <p>The <code>--url</code> argument value must be the URL of the ECS Management Console.</p> <p>The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of an ECS administrator user.</p> <p>You can optionally add the <code>--force</code> argument to avoid the password validation.</p>
<code>ose ecs show</code>	<p>Returns details about the configuration of ECS components.</p> <p>You can optionally add the <code>--with-secret</code> argument to get the passwords of the ECS user accounts.</p>
<b>Object Storage Interoperability Service Configuration Scripts</b>	
<code>ose osis admin set</code>	<p>Configures a connection between VMware Cloud Director Object Storage Extension and the admin service of the Object Storage Interoperability Service instance.</p> <p>The <code>--name</code>, <code>--url</code>, <code>--user</code>, and <code>--secret</code> arguments are required.</p> <p>The <code>--name</code> argument value must be the name of the Object Storage Interoperability Service instance.</p> <p>The <code>--url</code> argument value must be the URL of the Object Storage Interoperability Service admin service.</p> <p>The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of an Object Storage Interoperability Service admin service administrator user.</p> <p>You can optionally add the <code>--force</code> argument to avoid the password validation.</p>

Script	Description
<code>ose osis s3 set</code>	<p>Configures a connection between the Object Storage Interoperability Service S3 service and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--name</code> argument is required and the value must be the name of the Object Storage Interoperability Service instance.</p> <p>The <code>--url</code> argument is required and the value must be the FQDN or the IP address of the S3 service.</p>
<b>VMware Cloud Director Object Storage Extension Service Configuration Scripts</b>	
<code>ose args set</code>	<p>Sets VMware Cloud Director Object Storage Extension service arguments. Service arguments are a key-value pair. Use the <code>--k</code> and <code>--v</code> arguments to define the key and value.</p> <p>The <code>--k</code> argument value must be the key and the <code>--v</code> argument value must be the value.</p>
<code>ose args get</code>	<p>Returns details about a VMware Cloud Director Object Storage Extension service argument.</p> <p>Use the <code>--k</code> argument to retrieve service arguments by their key.</p>
<code>ose args del</code>	<p>Deletes VMware Cloud Director Object Storage Extension service arguments.</p> <p>Use the <code>--k</code> argument to delete service arguments by their key.</p>
<code>ose args show</code>	Returns details about all VMware Cloud Director Object Storage Extension service argument.
<code>ose service start</code>	<p>Starts the VMware Cloud Director Object Storage Extension service.</p> <p>You can optionally add the <code>--debug</code> argument to change the service logging level to <code>debug</code>.</p>
<code>ose service stop</code>	Stops the VMware Cloud Director Object Storage Extension service.
<code>ose service restart</code>	<p>Restarts the VMware Cloud Director Object Storage Extension service.</p> <p>You can optionally add the <code>--debug</code> argument to change the service logging level to <code>debug</code>.</p>
<code>ose service show</code>	Returns the VMware Cloud Director Object Storage Extension service status and configuration.
<b>Kubernetes Backup and Restore Scripts</b>	
<code>ose k8s-br start</code>	Starts the VMware Cloud Director Object Storage Extension Kubernetes backup and restore service.
<code>ose k8s-br show</code>	Returns the VMware Cloud Director Object Storage Extension Kubernetes backup and restore service status.
<code>ose k8s-br stop</code>	Stops the VMware Cloud Director Object Storage Extension Kubernetes backup and restore service.
<b>Data Migration Scripts</b>	
<code>ose migration start</code>	<p>Starts data migration from VMware Cloud Director Object Storage Extension version 1.0 to version 1.0.1 or from version 1.0 to version 1.5.</p> <p>To restart the process, rerun the script with the <code>--force</code> argument.</p>

Script	Description
<code>ose migration show</code>	Returns details about the migration progress.
<b>Configuration Scripts</b>	
<code>ose config validate</code>	Validates the configuration of VMware Cloud Director Object Storage Extension.
<code>ose config export</code>	Exports the configuration of VMware Cloud Director Object Storage Extension to a JSON file. The <code>--file</code> and <code>--secret</code> arguments are required. The <code>--file</code> argument value must be the export filename. The <code>--secret</code> argument value must be the password of a VMware Cloud Director system administrator.
<code>ose config import</code>	Imports the configuration of VMware Cloud Director Object Storage Extension from a JSON file. The <code>--path</code> and <code>--secret</code> arguments are required. The <code>--file</code> argument value must be the source directory for the import. The <code>--secret</code> argument value must be the password of a VMware Cloud Director system administrator.
<b>Administration Scripts</b>	
<code>ose support</code>	Generates a support bundle. The <code>--start</code> argument is optional and defines the start time for the logs to be collected. The default value is 2018-01-01. The <code>--end</code> argument is optional and defines the end time for the logs to be collected. If not specified, the end date is the current date. For the <code>--start</code> and the <code>--end</code> arguments values, enter the date in the YYYY-MM-DD format.
<b>Java Virtual Machine (JVM) Configuration Scripts</b>	
<code>ose jvmargs set</code>	Configures the JVM arguments. Use the <code>-v</code> argument to define the JVM arguments. For example, to set an HTTP proxy, run the following command: <code>ose jvmargs -v "Dhttp.proxyHost=proxy.cloud.com -Dhttp.proxyPort=3128"</code> .
<code>ose jvmargs delete</code>	Deletes the JVM arguments configuration.
<code>ose jvmargs show</code>	Returns details about the JVM arguments configuration.

## Install VMware Cloud Director Object Storage Extension

To install VMware Cloud Director Object Storage Extension, deploy an installation package to a target Linux virtual machine and use the `ose` command-line utility to configure VMware Cloud Director Object Storage Extension and the external components.

For security purposes, VMware Cloud Director Object Storage Extension validates the complexity of all passwords. When you set passwords by using the `ose` command-line utility, make sure that the password contains:

- At least eight characters
- Minimum one uppercase character
- Minimum one lowercase character
- Minimum one numeric digit character
- Minimum one non-alphanumeric character.

Use only visible ASCII characters. Do not use space and non-printing control characters, such as BEL or NUL.

VMware Cloud Director Object Storage Extension performs a password validation as part of the execution of the following scripts:

- `ose cert import`
- `ose director set`
- `ose db set`

For testing purposes, you can avoid the password validation by adding the `--force` argument to the script that you run.

#### Prerequisites

- Verify that your target environment and target machine meet the deployment and hardware requirements. See [Chapter 2 Installation and Configuration Requirements](#).
- Verify that you have a dedicated database instance and a database user that has enough privileges to create tables and change schemas.
- Verify that the installation package is uploaded to the `/temp` directory of the target machine.
- Verify that you have installed Openssl 1.x on the target machine.

#### Procedure

- 1 Open an SSH connection to the target machine and log in as **root**.
- 2 Install VMware Cloud Director Object Storage Extension from the installation package.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Oracle Linux	<code>yum install /temp/vmware-ose-2.1.1-17852793.e17.x86_64.rpm</code>
Photon OS	<code>rpm -ivh /temp/vmware-ose-2.1.1-52392538.ph3.x86_64.rpm</code>
Ubuntu, Debian	<code>sudo apt-get install /temp/vmware-ose_\${v.v.v-\$nnnnnnnn}.deb</code>

The VMware Cloud Director Object Storage Extension Keeper Service starts immediately after the installation package is installed.

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**Important** If you are deploying the installation package as part of upgrading VMware Cloud Director Object Storage Extension, do not perform any further command-line configuration steps. Keep the VMware Cloud Director Object Storage Extension server running for about a minute and continue the upgrade process.

If you are deploying the installation package as part of a clean installation of VMware Cloud Director Object Storage Extension, proceed to the next step.

---

- 3 Verify that the `ose` command-line utility works, by running the following command:

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose -h</code>
Ubuntu, Debian	<code>sudo ose -h</code>

The system returns help information about the `ose` command-line utility.

#### 4 Import an externally signed SSL certificate.

- a Prepare the PKCS 12 keystore with the externally signed certificate and a unique alias by running the `export` command.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<pre>openssl.exe pkcs12 -export -in cert-file-name.cer -inkey s3.key -CAfile CA-cert-file-name.cer -passout pass:password -out PKCS-file-name.p12 -chain -name unique-cert-alias</pre>
Ubuntu, Debian	<pre>sudo openssl.exe pkcs12 -export -in cert-file-name.cer -inkey s3.key -CAfile CA-cert-file-name.cer -passout pass:password -out PKCS-file-name.p12 -chain -name unique-cert-alias</pre>

In the current example, the `openssl` tool is used for exporting the certificate. You can use an alternative tool.

For example:

```
openssl.exe pkcs12 -export -in s3.cer -inkey s3.key -CAfile CA.cer -passout
pass:ChangeIt! -out s3.p12 -chain -name s3
```

- b Import the certificate to your PKCS12 keystore by running the `import` command.

For this Linux distribution...	Use this command...
CentOS, Photon OS, Oracle Linux	<pre>ose cert import --path path-to-keystore-file --secret 'password-of-the-keystore'</pre>
Red Hat Enterprise Linux	<pre>ose config import -file ph3config -secret vmware</pre>
Ubuntu, Debian	<pre>sudo ose cert import --path path-to-keystore-file -- secret 'password-of-the-keystore'</pre>

If the password that you enter contains a single quote character ('), run the command without the `--secret` argument. The system prompts you to enter the password on a new line.

For example:

```
ose cert import --path ./ose-service.p12 --secret 'ChangeIt!'
```

for RPM packages or

```
sudo ose cert import --path ./ose-service.p12 --secret 'ChangeIt!'
```

for DEB packages.

- a For testing purposes, instead of importing a certificate, you can generate a self-signed SSL certificate by running the following command:

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose cert gen --cn common-name-of-ose-host --secret certificate-password</code>
Ubuntu, Debian	<code>sudo ose cert gen --cn common-name-of-ose-host --secret certificate-password</code>

For example, `ose cert gen --cn s3.acme.com`.

## 5 Configure the database connection.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose db set --url jdbc:postgresql://db_host:db_port/db_instance --user 'db-user' --secret 'db-password'</code>
Ubuntu, Debian	<code>sudo ose db set --url jdbc:postgresql://db_host:db_port/db_instance --user 'db-user' --secret 'db-password'</code>

If the password that you enter contains a single quote character ('), run the command without the `--secret` argument. The system prompts you to enter the password on a new line.

For example:

```
ose db set --url jdbc:postgresql://localhost:5432/ossdb --user oseadmin --secret
'ChangeIt!'
```

## 6 Configure the connection to VMware Cloud Director.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose director set --url vcd-url --user vcd-sysadmin-user@system --secret 'vcd-sysadmin-password'</code>
Ubuntu, Debian	<code>sudo ose director set --url vcd-url --user vcd-sysadmin-user@system --secret 'vcd-sysadmin-password'</code>

**Important** For the `--user` argument value, if you are installing VMware Cloud Director Object Storage Extension to a multisite VMware Cloud Director environment, make sure that the **system administrator** account can log in to all sites.

The system administrator user name that you enter must be with an `@system` suffix.

For example:

```
ose director set --url https://vcd.acme.com --user vcd-admin-user@system --secret
'ChangeIt!'
```

If the password you enter contains a single quote character ('), run the command without the `--secret` argument and the system prompts you to enter the password in a new line.

- 7 If you want to use the Kubernetes backup and restore feature, you must start the service.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose k8s-br start</code>
Ubuntu, Debian	<code>sudo ose k8s-br start</code>

- 8 Install the VMware Cloud Director Object Storage Extension user interface plug-in.

For this Linux distribution...	Use this command...
CentOS, Red Hat Enterprise Linux, Photon OS, Oracle Linux	<code>ose ui install --ose-url ose-host-url</code>
Ubuntu, Debian	<code>sudo ose ui install --ose-url ose-host-url</code>

Here, *ose-host-url* is the public server endpoint of VMware Cloud Director Object Storage Extension. Typically, the public server endpoint is the HTTPS URL of the VMware Cloud Director Object Storage Extension host on port 443. It becomes available after you complete the configuration and start the VMware Cloud Director Object Storage Extension service. Make sure that the URL is open for a public access.

If you deploy multiple instances of VMware Cloud Director Object Storage Extension behind a load balancer, the *ose-host-url* must be the public FQDN of VMware Cloud Director Object Storage Extension.

For example:

```
ose ui install --ose-url https://ose-host:443
```

### What to do next

Configure VMware Cloud Director Object Storage Extension with AWS.

## Configure VMware Cloud Director Object Storage Extension with AWS

To configure VMware Cloud Director Object Storage Extension with AWS, you provide the region, the secret, and the access keys of your AWS payer account.

When you configure VMware Cloud Director Object Storage Extension with AWS, you establish the connection to the following AWS services:

- Identity and Access Management (IAM) Service
- Simple Storage Service (S3)
- Security Token Service (STS)
- Organization Service
- (Optional) Key Management Service (KMS)

#### Prerequisites

- Verify that you have an AWS payer account that is assigned with full privileges to the organization unit of the account.

---

**Important** It is advised that you create an Identity and Access Management (IAM) user for your AWS payer account and use the IAM user to establish the connection between AWS and VMware Cloud Director Object Storage Extension instead.

Assign the following permission to the IAM user:

- **Amazon S3 Full Access**
  - **AWS Organizations Full Access**
  - **AWS IAM Full Access**
  - **AWS STS Full Access**
  - **AWS Key Management Service Full Access**
- 
- Verify that VMware Cloud Director Object Storage Extension has outbound access to AWS services.

#### Procedure

- 1 Open an SSH connection to the machine on which you installed VMware Cloud Director Object Storage Extension.
- 2 Start the VMware Cloud Director Object Storage Extension Keeper service.

```
systemctl start voss-keeper
```

- 3 Configure the connection to AWS.

```
ose amazon set --region aws-payer-account-region --access-key account-access-key --secret-key account-secret-key
```

For example:

```
ose amazon set --region us-east-1 --access-key AKIAIOSFODNN7EXAMPLE --secret-key wJalrXUtnFEMI/K7MDENG/bPxrFiCYEXAMPLEKEY
```

#### 4 Validate the configuration.

```
ose config validate
```

If all components are successfully configured, the system returns the following message:

Name	Required	Connectivity	Detail
Database	Y	Normal	
Certificate	Y	Normal	
Cloud Director	Y	Normal	
Platform - AWS	Y	Normal	
AWS IAM service	Y	Normal	
AWS S3 service	Y	Normal	
AWS STS service	Y	Normal	
AWS Organization service	Y	Normal	

If the system returns an error, review the log file at `/opt/vmware/voss/log`.

#### 5 Verify the status of the VMware Cloud Director Object Storage Extension service.

```
ose service show
```

If the VMware Cloud Director Object Storage Extension service runs as expected, the system returns a `Running` status and configuration details.

If you receive an error message, you can start the VMware Cloud Director Object Storage Extension service in debugging mode by adding the `--debug` argument and troubleshoot the problem.

#### 6 Start VMware Cloud Director Object Storage Extension services.

```
ose service start
```

#### 7 (Optional) Get configuration details.

```
ose amazon show
```

The system returns the AWS configuration details.

## Results

You installed VMware Cloud Director Object Storage Extension and configured it to work with the native AWS S3 provided by VMware Cloud on AWS.

## What to do next

You can now get acquainted with the user interface of VMware Cloud Director Object Storage Extension. See [Working with VMware Cloud Director Object Storage Extension as a Cloud Provider](#).

You can also start onboarding your organizations and users to AWS. See [Onboarding VMware Cloud Director Organizations and Users to AWS](#).