

Installing, Configuring, and Upgrading VMware Cloud Director Object Storage Extension

16 APR 2020

VMware Cloud Director Object Storage Extension 1.5

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

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Contents

1	What is VMware Cloud Director Object Storage Extension	4
2	Deploying VMware Cloud Director Object Storage Extension	8
	Before You Begin	9
	Network Ports Configuration	10
	ECS Deployment Requirements	13
	Cloudian Deployment Requirements	13
	Configuring and Managing Multisite Deployments	14
3	Installing and Configuring VMware Cloud Director Object Storage Extension	17
	VMware Cloud Director Object Storage Extension Command-Line Interface Reference	18
	Install VMware Cloud Director Object Storage Extension	22
	Configuring VMware Cloud Director Object Storage Extension	25
	Configure VMware Cloud Director Object Storage Extension with ECS	26
	Configure VMware Cloud Director Object Storage Extension with Cloudian HyperStore	29
	Configure Additional VMware Cloud Director Object Storage Extension Instances Behind a Load Balancer	32
4	Uninstall VMware Cloud Director Object Storage Extension	34
5	Upgrading VMware Cloud Director Object Storage Extension	35
	Prepare the Database for Upgrade	35
	Migrate VMware Cloud Director Object Storage Extension Data	36

What is VMware Cloud Director Object Storage Extension

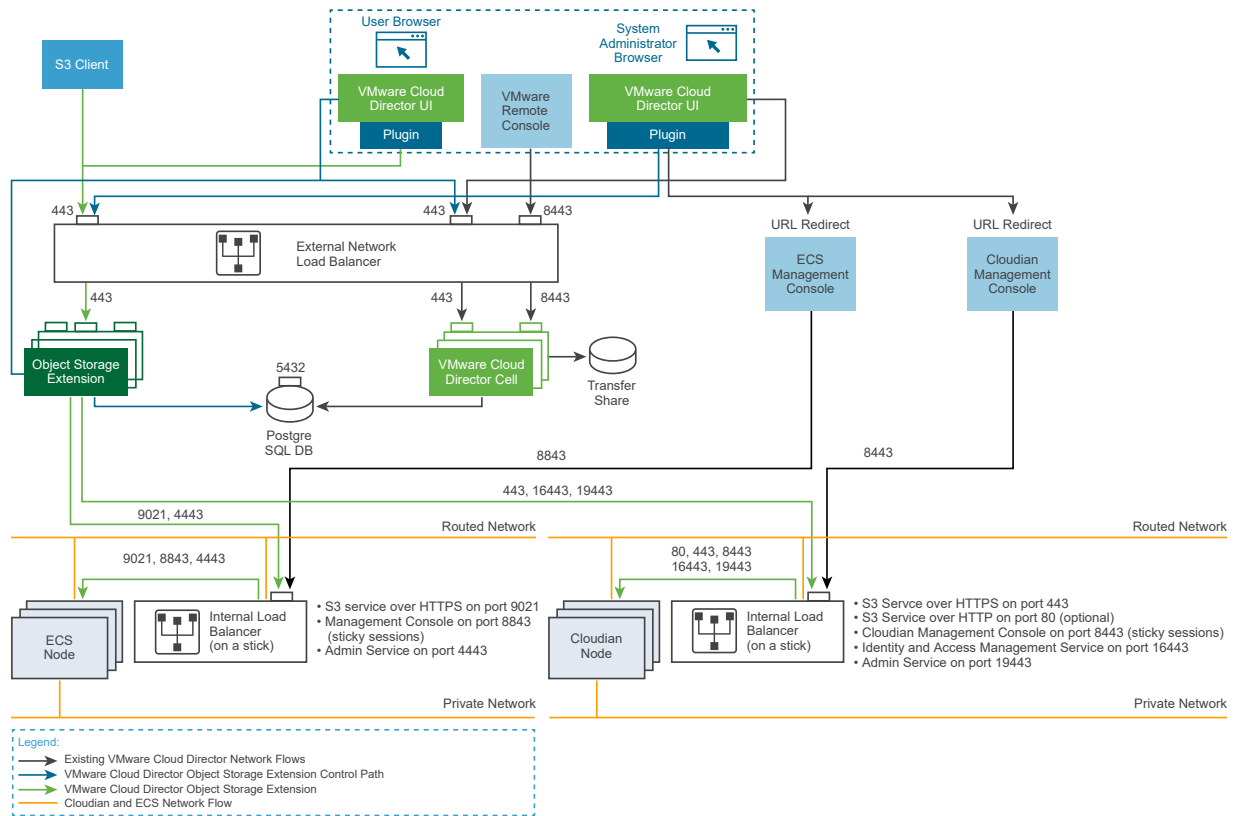
1

VMware Cloud Director Object Storage Extension is a standalone middleware service that you install in your data center to provide object storage capabilities to the users of VMware Cloud Director.

Architecture of VMware Cloud Director Object Storage Extension

During installation and configuration, the user interface of VMware Cloud Director Object Storage Extension registers as a user interface plug-in to VMware Cloud Director by using the Portal Extensibility Framework. As a result, you can access the user interface of VMware Cloud Director Object Storage Extension directly from the VMware Cloud Director service provider admin portal as a system administrator and from the VMware Cloud Director tenant portal as an organization user.

VMware Cloud Director Object Storage Extension runs on top of a Cloudian HyperStore or a Dell EMC ECS storage cluster. The following diagram illustrates the architecture of VMware Cloud Director Object Storage Extension and the network connections between the components.



Components of VMware Cloud Director Object Storage Extension

VMware Cloud Director Object Storage Extension consists of four components.

Table 1-1. Components of VMware Cloud Director Object Storage Extension

Component	Description
VMware Cloud Director Object Storage Extension Service	The public service of VMware Cloud Director Object Storage Extension that provides the APIs for the data path and the control path on port 443.
VMware Cloud Director Object Storage Extension Keeper (<code>voss-keeper</code>) Service	<p>The system service for the VMware Cloud Director Object Storage Extension service and the <code>ose</code> command-line utility. The <code>voss-keeper</code> service runs as a system service and you can manage it by using the <code>systemctl</code> command-line utility.</p> <p>Stopping the <code>voss-keeper</code> service also stops the VMware Cloud Director Object Storage Extension service on port 443.</p> <ul style="list-style-type: none"> ■ Installs and starts the VMware Cloud Director Object Storage Extension middleware service and the user interface plug-in. ■ Monitors the health of the Java daemon that VMware Cloud Director Object Storage Extension uses. ■ Synchronizes the configuration between VMware Cloud Director Object Storage Extension nodes within a cluster. ■ Installs and starts the internal virtual IP translation server.
Command-Line Utility (<code>ose</code>)	Contains the scripts required for configuring VMware Cloud Director Object Storage Extension and starting or stopping the Java daemon.
VMware Internationalization Protocol Service	This is an internal service that translates text strings within the user interface of VMware Cloud Director Object Storage Extension. The service runs as a system service and you can manage it by using the <code>systemctl</code> command-line utility.

Roles and Rights in VMware Cloud Director Object Storage Extension

Any user with an account that is enabled from 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.

Table 1-2. Mapping Between VMware Cloud Director Rights and VMware Cloud Director Object Storage Extension Roles

VMware Cloud Director Object Storage Extension Tenant Portal Role	VMware Cloud Director Rights	Notes
Provider Administrator	<ul style="list-style-type: none"> ■ General: Administrator View ■ Provider VDC: View ■ Organization VDC: View ■ UI Plugins: View 	None.
Tenant Administrator	<ul style="list-style-type: none"> ■ General: Administrator View ■ Organization VDC: View ■ UI Plugins: View 	Tenant administrators in VMware Cloud Director Object Storage Extension must not have the Provider VDC: View role assigned to their user account in VMware Cloud Director. If you assign the Provider VDC: View role to a Tenant Administrator , the user role in VMware Cloud Director Object Storage Extension changes to Provider Administrator .
Tenant User	UI Plugins: View	Tenant users in VMware Cloud Director Object Storage Extension must not have the General: Administrator View and the General: Administrator View roles assigned to their user account in VMware Cloud Director. If you assign these roles to a Tenant User , the user role in VMware Cloud Director Object Storage Extension changes to Tenant Administrator .

For information about the predefined roles and their rights in VMware Cloud Director, see [Predefined Roles and Their Rights](#).

Deploying VMware Cloud Director Object Storage Extension

2

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

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

- CentOS Linux 7
- CentOS Linux 6
- RedHat Enterprise Linux 7
- Oracle Linux 7

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

Deployment Types and Hardware Requirements

Depending on your scale and 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 Cloudian HyperStore 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">■ 4 Core CPU■ 8 GB RAM■ 120 GB free disk space
Medium	Deploy a virtual Cloudian HyperStore 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">■ 8 Core CPU■ 8 GB RAM■ 120 GB Free Disk Space
Large	Configure Cloudian HyperStore 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">■ 12 Core CPU■ 12 GB RAM■ 120 GB Free Disk Space

This chapter includes the following topics:

- [Before You Begin](#)
- [Network Ports Configuration](#)
- [ECS Deployment Requirements](#)
- [Cloudian Deployment Requirements](#)
- [Configuring and Managing Multisite Deployments](#)

Before You Begin

Before you deploy VMware Cloud Director Object Storage Extension, you must prepare your environment. VMware Cloud Director Object Storage Extension requires specific external components of specific versions.

The following table lists the software components and the supported versions of the components that you must deploy and configure.

Required Component	Supported Versions
VMware Cloud Director	<ul style="list-style-type: none"> ■ 10.1 ■ 10 ■ 9.7 ■ 9.5 <hr/> <p>Note To work with VMware Cloud Director Object Storage Extension, the VMware Cloud Director instance you use must support VMware Cloud Director service provider admin portal and VMware Cloud Director tenant portal.</p>
Cloudian HyperStore	<p>If you are deploying VMware Cloud Director Object Storage Extension on top of Cloudian HyperStore, a cluster of at least 3 Cloudian HyperStore nodes is required.</p> <ul style="list-style-type: none"> ■ For VMware Cloud Director Object Storage Extension 1.5, install and configure 7.1.6 or 7.2. ■ For VMware Cloud Director Object Storage Extension 1.0.1, install and configure Cloudian HyperStore 7.1.6. ■ For VMware Cloud Director Object Storage Extension 1.0, install and configure Cloudian HyperStore 7.1.4. <p>For more information about the requirements specifics to Cloudian HyperStore, see Cloudian Deployment Requirements.</p>
Dell EMC ECS	<p>If you are deploying VMware Cloud Director Object Storage Extension on top of ECS, a cluster of at least 3 ECS nodes is required.</p> <p>VMware Cloud Director Object Storage Extension supports ECS version 3.4.</p>
Database	PostgreSQL 9.5 or later

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 does not require the RabbitMQ message bus for communication with VMware Cloud Director.

Make sure that the clocks of all VMware Cloud Director Object Storage Extension and storage platform nodes are synchronized. As a best practice, you can use the same Network Time Protocol (NTP) server.

Requirements for Virtual Hosted-Style S3 API Request

Starting with VMware Cloud Director Object Storage Extension 1.5, you can make S3 REST API requests using virtual hosted-style URIs.

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

Network Ports Configuration

Ensure that the required network ports are open for the VMware Cloud Director Object Storage Extension services communication.

Table 2-1. Ports and Protocols Required for the VMware Cloud Director Object Storage Extension Services

Source	Destination	Port	Protocol	Description
VMware Cloud Director service provider admin portal, VMware Cloud Director tenant portal, or a S3 client	VMware Cloud Director Object Storage Extension	443	TCP	The public API port of VMware Cloud Director Object Storage Extension.
The <code>ose</code> utility on the Linux machine	VMware Cloud Director Object Storage Extension	5198	TCP	Used for configuring the VMware Cloud Director Object Storage Extension Keeper service (<code>voss-keeper</code>).
VMware Cloud Director Object Storage Extension	VMware Cloud Director	443	TCP	Used for interactions with VMware Cloud Director.
VMware Cloud Director Object Storage Extension	VMware Cloud Director Object Storage Extension	8091	TCP	Used for the translation-related communication between the VMware Cloud Director Object Storage Extension Service Java daemon and the internal VMware internationalization protocol Java daemon.
VMware Cloud Director Object Storage Extension	PostgreSQL Server	5432	TCP	Used for communication between the PostgreSQL database and VMware Cloud Director Object Storage Extension.
VMware Cloud Director Object Storage Extension	Cloudian HyperStore	19443	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the Cloudian Admin Service.

Table 2-1. Ports and Protocols Required for the VMware Cloud Director Object Storage Extension Services (continued)

Source	Destination	Port	Protocol	Description
VMware Cloud Director Object Storage Extension	ECS	4443	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the ECS Admin Service.
VMware Cloud Director Object Storage Extension	Cloudian HyperStore	8443	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the Cloudian Management Console.
VMware Cloud Director Object Storage Extension	ECS	8843	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the ECS Management Console .
VMware Cloud Director Object Storage Extension	Cloudian HyperStore	443, 80 (optional)	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the Cloudian S3 Service.
VMware Cloud Director Object Storage Extension	ECS	4443	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the ECS S3 Service.
VMware Cloud Director Object Storage Extension	Cloudian HyperStore	16443, 16080 (optional)	TCP	Used for communication between VMware Cloud Director Object Storage Extension and the Cloudian IAM Service.

ECS Deployment Requirements

If you want to deploy VMware Cloud Director Object Storage Extension on top of an ECS cluster, the ECS cluster must meet specific criteria.

Following is a list of the ECS components that you must deploy.

- An ECS Admin Service HTTPS API endpoint accessible from the internal network of VMware Cloud Director. By default, the endpoint is configured to use port 9021.
- ECS S3 Service accessible from the internal network of VMware Cloud Director. By default, the S3 service uses port 4443 for SSL communication.
- ECS Management Console accessible from external networks.

To synchronize the clocks of all VMware Cloud Director Object Storage Extension and ECS nodes, use the same NTP server.

Cloudian Deployment Requirements

If you want to deploy VMware Cloud Director Object Storage Extension on top of a Cloudian cluster, the Cloudian cluster must meet specific requirements.

Required Cloudian Components

Following is a list of the Cloudian components that you must deploy.

- A Cloudian HyperStore cluster with at least three nodes.
- A Cloudian HyperStore Admin Service HTTPS API endpoint accessible from the internal network of VMware Cloud Director. By default, the endpoint is configured to use port 19443.
- Cloudian HyperStore S3 Service accessible from the internal network of VMware Cloud Director. By default, the S3 service uses port 443 for SSL communication.
- Cloudian HyperStore Identity and Access Management Service (IAM) accessible from the internal network of VMware Cloud Director. By default, the IAM service uses port 16443 for SSL communication.
- Cloudian Management Console accessible from external networks.

Required Configuration of Cloudian Components

VMware Cloud Director Object Storage Extension requires specific configurations of the Cloudian components in your environment.

Following is a list of specific configurations of Cloudian components that VMware Cloud Director Object Storage Extension requires.

- Enable single sign-on (SSO) and provide a unique shared key for the Cloudian Management Console. Note the shared key and the SSO login user, as you need them during the configuration of VMware Cloud Director Object Storage Extension.

- To meet the VMware Cloud Director user-mapping requirements, increase the maximum length of Cloudian HyperStore user IDs from 64 bytes to 255 bytes.
- Enable HyperStore Identity and Access Manager.
- Enable Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols on the S3 endpoint.
- Enable shared buckets lists.
- By default, Cloudian HyperStore is configured with an open HTTP port used for the S3 API communication. Use the Cloudian HyperStore HTTP port with VMware Cloud Director Object Storage Extension only if performance is more important than security. If your tenants need to use the SSE-C encryption type, an opened HTTPS port is required.
- Create a default storage policy. For more information, see *Getting Started with a New HyperStore System* in the *Cloudian HyperStore Admin Guide*.

To synchronize the clocks of all VMware Cloud Director Object Storage Extension and Cloudian nodes, use the same NTP server.

For information about installing, configuring, and scaling Cloudian components for integration with VMware Cloud Director Object Storage Extension, see <https://cloudian.com/vmware-docs/>.

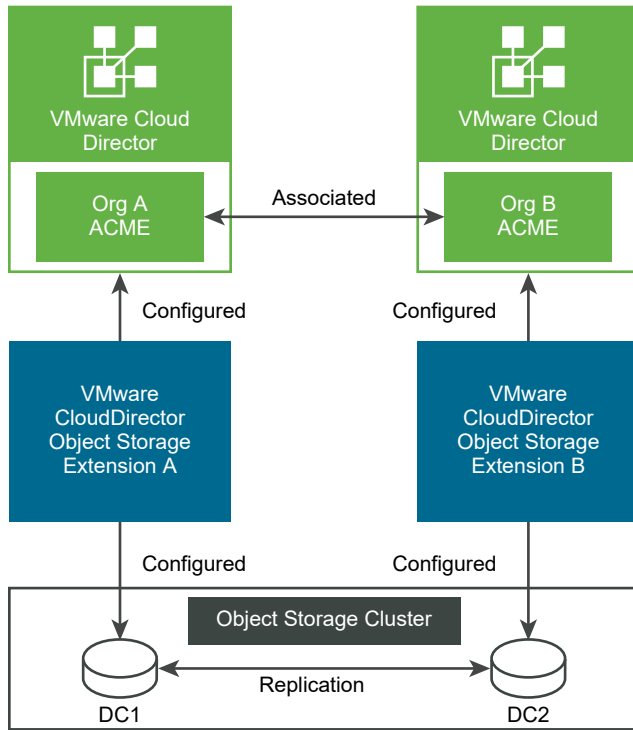
Configuring and Managing Multisite Deployments

The VMware Cloud Director multisite feature enables a service provider or a tenant of multiple, geographically distributed VMware Cloud Director installations (server groups) to manage and monitor those installations and their organizations as single entities.

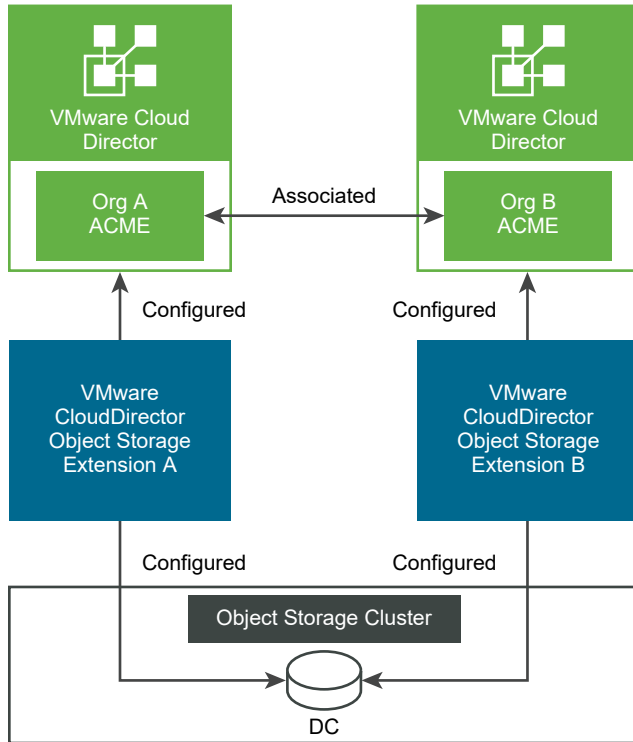
You can deploy and configure VMware Cloud Director Object Storage Extension within a multisite VMware Cloud Director architecture. By configuring VMware Cloud Director Object Storage Extension within a multisite architecture, you enable tenant users to preview and download objects in remote sites.

With the multisite feature, you achieve high availability and provide a single point of data access for organization users.

Within a multisite architecture, you can configure VMware Cloud Director Object Storage Extension instances with a standalone virtual data center in each site. The following diagram illustrates the architecture.



You can also configure VMware Cloud Director Object Storage Extension instances in different sites to use a single virtual data center. The following diagram illustrates the architecture.



When you configure the multisite feature, you create a cluster of multiple VMware Cloud Director Object Storage Extension instances to create an availability zone. You can group the VMware Cloud Director Object Storage Extension instances together only in a single region. A region is a collection of compute resources in a geographic area. Regions are isolated and independent of one another. VMware Cloud Director Object Storage Extension does not support multi-region architectures.

You can share the same buckets and objects across tenant organizations within a multisite environment. To share buckets and objects across sites, map all tenant organizations to the same storage group. See [Edit Tenant Mapping Configuration](#).

Multisite Deployment Requirements for VMware Cloud Director Object Storage Extension

When you configure the multisite feature with VMware Cloud Director Object Storage Extension, consider the following requirements.

- Associate the VMware Cloud Director sites that you want to use in the multisite environment. For more information, see the *VMware Cloud Director Service Provider Admin Portal Guide*.
- Deploy and configure a VMware Cloud Director Object Storage Extension instance in each site.
- You can share your storage platform cluster across sites, or you can deploy and configure all required Cloudian HyperStore or ECS components in each site.
- Join the storage clusters into a distribution group.
For Cloudian HyperStore, setup a storage policy with a multi-DC data distribution group.
For ECS, set up replication groups across the virtual data centers.

Installing and Configuring VMware Cloud Director Object Storage Extension

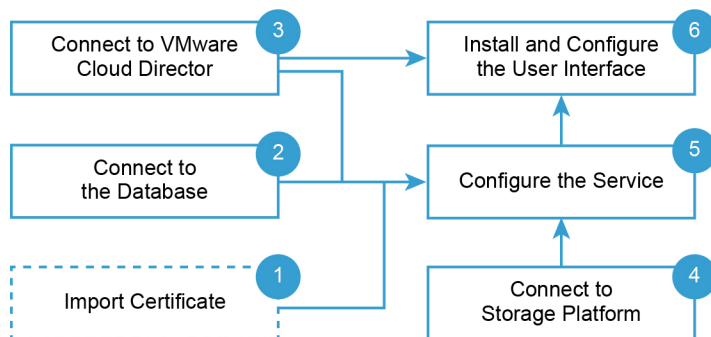
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VMware Cloud Director Object Storage Extension is distributed as an RPM installation file with a name in the format `vmware-ose-v.v.v-nnnnnnnn.el7.x86_64.rpm`, where *v.v.v* is the product version and *nnnnnnnn* is the build number. For example, `vmware-ose-1.0.0-24012158.el7.x86_64.rpm`.

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.

The following diagram shows the workflow for installing and configuring of VMware Cloud Director Object Storage Extension.



This chapter includes the following topics:

- [VMware Cloud Director Object Storage Extension Command-Line Interface Reference](#)
- [Install VMware Cloud Director Object Storage Extension](#)
- [Configuring VMware Cloud Director Object Storage Extension](#)
- [Configure Additional VMware Cloud Director Object Storage Extension Instances Behind a Load Balancer](#)

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.
SSL Certificate Management Scripts	
<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.
Database Configuration Scripts	
<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.
VMware Cloud Director Configuration Scripts	

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>	<p>Uninstalls the VMware Cloud Director Object Storage Extension user interface plug-in for VMware Cloud Director.</p>
<code>ose ui show</code>	<p>Returns details about the configuration of the VMware Cloud Director Object Storage Extension user interface plug-in for VMware Cloud Director.</p>
Storage Platform Configuration Scripts	
<code>ose platforms enable</code>	<p>Enables VMware Cloud Director Object Storage Extension to work with either Cloudian or ECS storage platforms.</p> <p>To enable the Cloudian storage platform, run the <code>ose platforms enable cloudian</code> script.</p> <p>To enable the ECS storage platform, run the <code>ose platforms enable ecs</code> script.</p>
<code>ose platforms show</code>	<p>Returns details about the platform that is configured for use in VMware Cloud Director Object Storage Extension.</p>
Cloudian Configuration Scripts	
<code>ose cloudian admin set</code>	<p>Configures a connection between the Cloudian 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 Cloudian Admin service.</p> <p>The <code>--user</code> and <code>--secret</code> arguments values must be the credentials of a Cloudian 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 cloudian s3 set</code>	<p>Configures a connection between the Cloudian S3 service and VMware Cloud Director Object Storage Extension.</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> <p>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.</p>
<code>ose cloudian iam set</code>	<p>Configures a connection between the Cloudian IAM service and VMware Cloud Director Object Storage Extension.</p> <p>The <code>--url</code> argument is required and the value must be the URL of the Cloudian IAM service.</p>
<code>ose cloudian console set</code>	<p>Configures the connection between the Cloudian 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 Cloudian Management Console.</p> <p>The <code>--user</code> argument value must be the user name of a Cloudian system administrator.</p> <p>The <code>--secret</code> argument value must be the single sign-on shared key that is configured in the Cloudian Management Console.</p> <p>You can optionally add the <code>--force</code> argument to avoid the password validation.</p>
<code>ose cloudian show</code>	<p>Returns details about the configuration of Cloudian components.</p> <p>You can optionally add the <code>--with-secret</code> argument to get the passwords of the Cloudian user accounts.</p>
ECS Configuration Scripts	
<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>

Script	Description
<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>
Cloud Director Object Storage Extension Service Configuration Scripts	
<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>	<p>Returns details about all VMware Cloud Director Object Storage Extension service argument.</p>
<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>	<p>Stops the VMware Cloud Director Object Storage Extension service.</p>
<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>

Script	Description
<code>ose service show</code>	Returns the VMware Cloud Director Object Storage Extension service status and configuration.
Data Migration Scripts	
<code>ose migration start</code>	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. To restart the process, rerun the script with the <code>--force</code> argument.
<code>ose migration show</code>	Returns details about the migration progress.
Configuration Scripts	
<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.

Install VMware Cloud Director Object Storage Extension

To install VMware Cloud Director Object Storage Extension, deploy an RPM 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 Deploying VMware Cloud Director Object Storage Extension](#).
- If you want to install VMware Cloud Director Object Storage Extension on top of a Cloudbian HyperStore cluster, verify that you upgraded your Cloudbian HyperStore to version 7.1.6 or 7.2. You must also increase the maximum length of Cloudbian HyperStore user IDs from 64 bytes to 255 bytes. See [Before You Begin](#) and [Cloudbian Deployment 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 RPM package is uploaded to the `/temp` directory of 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 RPM package by running the `yum install` command.

```
yum install /temp/vmware-ose-1.5.0-16046355.el7.x86_64.rpm
```

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

Important If you are deploying the RPM 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. See [Chapter 5 Upgrading VMware Cloud Director Object Storage Extension](#).

If you are deploying the RPM 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 `ose -h` command.

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.

```
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
```

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.

```
ose cert import --path path-to-keystore-file --secret 'password-of-the-keystore'
```

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!'
```

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

```
ose cert gen --cn common-name-of-ose-host --secret certificate-password
```

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

5 Configure the database connection.

```
ose db set --url jdbc:postgresql://db_host:db_port/db_instance --username 'db-user' --secret 'db-password'
```

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 --username oseadmin --secret 'ChangeIt!'
```


6 Configure the connection to VMware Cloud Director.

```
ose director set --url vcd-url --username vcd-sysadmin-user@system --secret 'vcd-sysadmin-
password'
```

Important For the `--username` 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 --username 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 Install the VMware Cloud Director Object Storage Extension user interface plug-in.

```
ose ui install --ose-url ose-host-url
```

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 a Clouidian HyperStore or an ECS cluster.

Configuring VMware Cloud Director Object Storage Extension

Starting with VMware Cloud Director Object Storage Extension 1.5, you can configure VMware Cloud Director Object Storage Extension with a Dell EMC ECS or with a Clouidian HyperStore cluster.

After you deploy VMware Cloud Director Object Storage Extension and configure the connections to VMware Cloud Director and your dedicated database, you configure the connections to the underlying storage cluster.

For information about configuring VMware Cloud Director Object Storage Extension with an ECS cluster, see [Configure VMware Cloud Director Object Storage Extension with ECS](#).

For information about configuring VMware Cloud Director Object Storage Extension with a Cloudian HyperStore cluster, see [Configure VMware Cloud Director Object Storage Extension with Cloudian HyperStore](#).

Configure VMware Cloud Director Object Storage Extension with ECS

Configuring VMware Cloud Director Object Storage Extension with an ECS cluster consists of establishing a connection between VMware Cloud Director Object Storage Extension and ECS services.

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 ecs admin set`
- `ose ecs console set`

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

Prerequisites

Verify that your ECS configuration meets the deployment requirements of VMware Cloud Director Object Storage Extension. See [ECS Deployment Requirements](#).

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 the ECS Admin Service HTTPS API endpoint.

```
ose ecs admin set --url ecs-admin-service-url --user admin-user --secret 'password'
```

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

For example:

```
ose ecs admin set --url https://object-storage.acme.com:19443 --user sysadmin --secret
'ChangeIt!'
```

4 Configure the connection to the ECS Management Console.

```
ose ecs console set --url ecs-console-url --user admin-user --secret admin-user-pass
```

For example:

```
ose ecs console set --url https://object-storage.acme.com:8443 --user admin --secret
ChangeIt!
```

5 Configure the connection to the ECS S3 Service.

```
ose ecs s3 set ecs-s3-url
```

To configure the connection, use 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 ECS 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 *bucket-name.ecs-s3-host* to *ecs-s3-host*. If you use the IP address of the S3 Service, no domain and virtual host route settings are required.

For example:

```
ose ecs s3 set https://object-storage.acme.com:443
```

6 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	
+-----+				
	Cloud Director		Y	
+-----+				
	Platform - ECS		Y	
+-----+				
	ECS Admin Service		Y	
+-----+				
	ECS Console Service		N	
+-----+				
	ECS S3 Service		Y	
+-----+				

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

7 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.

8 Start VMware Cloud Director Object Storage Extension services.

```
ose service start
```

9 (Optional) Get configuration details.

```
ose ecs show
```

The system returns the ECS configuration details in the following format:

```
[ECS Admin]
  URL: https://object-storage.acme.com:19443
  username: sysadmin
[ECS Console]
  URL: https://object-storage.acme.com:8443
  username: admin
[ECS S3]
  URL: https://object-storage.acme.com:443
```

Configure VMware Cloud Director Object Storage Extension with Clouidian HyperStore

Configuring VMware Cloud Director Object Storage Extension with a Clouidian HyperStore cluster consists of establishing a connection between the VMware Cloud Director Object Storage Extension and Clouidian HyperStore services.

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

- At least eight characters in length
- Minimum one uppercase character
- Minimum one lowercase character
- Minimum one numeric digit character
- Minimum one non-alphanumeric character. Use only visible American Standard Code for Information Interchange (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 clouidian admin set`
- `ose clouidian console set`

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

Prerequisites

- Verify that you deployed VMware Cloud Director Object Storage Extension and configured connections to VMware Cloud Director and to your database.
- Verify that you upgraded your Clouidian HyperStore to version 7.1.6 or 7.2.
- Verify that you increased the maximum length of Clouidian HyperStore user IDs from 64 bytes to 255 bytes. See [Before You Begin](#) and [Clouidian Deployment Requirements](#).

Procedure

- 1 Open an SSH connection to the machine to 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 the Clodian HyperStore Admin Service HTTPS API endpoint.

```
ose clodian admin set --url hyperstore-admin --user admin-user --secret 'password'
```

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.

For example:

```
ose clodian admin set --url https://object-storage.acme.com:19443 --user sysadmin --secret 'ChangeIt!'
```

- 4 Configure the connection to the Clodian HyperStore S3 Service.

```
ose clodian s3 set hyper-store-s3-url
```

To configure the connection, use 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 Clodian 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 *bucket-name.hyper-store-s3-host* to *hyper-store-s3-host*. If you use the IP address of the S3 Service, no domain and virtual host route settings are required.

For example:

```
ose clodian s3 set https://object-storage.acme.com:443
```

- 5 Configure the connection to the Clodian HyperStore IAM Service.

```
ose clodian iam set hyper-store-iam-url
```

For example:

```
ose clodian iam set http://object-storage.acme.com:16443
```

- 6 Configure the connection to the Clodian Management Console.

```
ose clodian console set --url hyperstore-cmc-url --user admin-user --secret cmc-sso-shared-key
```

The user name that you enter must be the user name of a valid system administrator user.

For the `--secret` argument value, enter the single sign-on shared key that is configured in the Cloudian Management Console.

For example:

```
ose cloudian console set --url https://object-storage.acme.com:8443 --user admin --secret
UinqeMQA9FAWy8zbDqWTLBRrg23U72xBWi
```

7 Validate the configuration of VMware Cloud Director Object Storage Extension .

```
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 - Cloudian	Y	Normal	
Cloudian Admin Service	Y	Normal	
Cloudian Console Service	N	Normal	
Cloudian S3 Service	Y	Normal	

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

- 8 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.

- 9 Start VMware Cloud Director Object Storage Extension services.

```
ose service start
```

Configure Additional VMware Cloud Director Object Storage Extension Instances Behind a Load Balancer

For scaling purposes, you might deploy additional instances of VMware Cloud Director Object Storage Extension behind the load balancer in your environment.

Prerequisites

Verify that you installed and configured additional node or nodes of VMware Cloud Director Object Storage Extension. See [Install VMware Cloud Director Object Storage Extension](#).

Procedure

- 1 Open SSH connections to the first instance of VMware Cloud Director Object Storage Extension that you deployed and to the additional nodes that you are configuring with the same load balancer.
- 2 Stop the VMware Cloud Director Object Storage Extension Keeper service on the additional instance or instances of VMware Cloud Director Object Storage Extension.

```
systemctl stop voss-keeper
```

- 3 Export the configuration from the initially deployed VMware Cloud Director Object Storage Extension.

```
ose config export --file="configuration-file-name" --secret="vcd-sys-admin-pass"
```

The script exports the configuration to an encrypted text file in the `root` directory.

For the `--file` argument value, enter the export filename. For the `--secret` argument value, enter the password of a VMware Cloud Director system administrator.

- 4 Copy the configuration file to the additional VMware Cloud Director Object Storage Extension instances that you configure.

- 5 Import the configuration to the additional instances of VMware Cloud Director Object Storage Extension.

```
ose config import --file="path-to-the-configuration-file" --secret="vcd-sys-admin-pass"
```

Here, the `--file` argument value, is the source directory for the import. The `--secret` argument value is the password of a VMware Cloud Director system administrator.

- 6 Restart the VMware Cloud Director Object Storage Extension Keeper service on the additional nodes of VMware Cloud Director Object Storage Extension.

```
systemctl restart voss-keeper
```

Uninstall VMware Cloud Director Object Storage Extension

4

To clean up your testing or development environment, you can uninstall VMware Cloud Director Object Storage Extension. When you uninstall VMware Cloud Director Object Storage Extension, you remove the software binaries. The configuration and log files remain in the file system of the host machine.

Procedure

- 1 Open an SSH connection to the VMware Cloud Director Object Storage Extension machine.
- 2 Stop the VMware Cloud Director Object Storage Extension Keeper service.

```
systemctl stop voss-keeper
```

- 3 Uninstall VMware Cloud Director Object Storage Extension.

- If you are uninstalling VMware Cloud Director Object Storage Extension 1.5, run the following command:

```
rpm -e vmware-ose
```

- If you are uninstalling VMware Cloud Director Object Storage Extension 1.0.X, run the following command:

```
rpm -e vmware-voss
```

The script stops VMware Cloud Director Object Storage Extension services and removes the software binaries from the host machine.

- 4 (Optional) After you uninstall VMware Cloud Director Object Storage Extension binaries, the configuration files remain in `/opt/vmware/voss` and the log files remain in `/opt/vmware/vip`. You can delete the directories by running the following command:

```
sudo rm -rf /opt/vmware/voss /opt/vmware/vip root-user-password
```

Upgrading VMware Cloud Director Object Storage Extension

5

You can upgrade to VMware Cloud Director Object Storage Extension 1.5 from versions 1.0 and 1.0.1.

To upgrade VMware Cloud Director Object Storage Extension, do the following:

- 1 Uninstall the earlier version of the software from the host machine. See [Chapter 4 Uninstall VMware Cloud Director Object Storage Extension](#).
- 2 Prepare your database for VMware Cloud Director Object Storage Extension 1.5. See [Prepare the Database for Upgrade](#).
- 3 Install the new RPM package. See [Install VMware Cloud Director Object Storage Extension](#).

If you are upgrading from VMware Cloud Director Object Storage Extension version 1.0, you must also run a data migration script. See [Migrate VMware Cloud Director Object Storage Extension Data](#).

This chapter includes the following topics:

- [Prepare the Database for Upgrade](#)
- [Migrate VMware Cloud Director Object Storage Extension Data](#)

Prepare the Database for Upgrade

VMware Cloud Director Object Storage Extension 1.5 introduces a change in the `bucket_info` table of the database. Before you upgrade VMware Cloud Director Object Storage Extension to version 1.5, prepare your database.

To prepare your database for upgrading VMware Cloud Director Object Storage Extension to VMware Cloud Director Object Storage Extension 1.5, remove the `conname` constraint from the `bucket_info` table.

Prerequisites

- Verify that the old version of VMware Cloud Director Object Storage Extension is uninstalled.
- Verify that you upgraded your PostgreSQL database to version 9.5 or later.
- Verify that you backed up your database.

Procedure

- 1 Log in to the PostgreSQL database as a database administrator.
- 2 Retrieve the OID of the `conname` constraint for the `bucket_info` table.

```
SELECT conname
FROM pg_constraint
WHERE conrelid =
    (SELECT oid
     FROM pg_class
     WHERE relname like 'bucket_info');
```

The system returns the OID string. For example, `ukb9c15fhp50s53gs8pntjaq5qt`. Copy the OID so that you can use it in the next step.

- 3 Remove the constraints from the `bucket_info` table.

```
ALTER TABLE bucket_info
    DROP CONSTRAINT IF EXISTS {OID};
```

- 4 (Optional) Delete the tables that are not used in VMware Cloud Director Object Storage Extension 1.5.

```
DROP TABLE IF EXISTS um_storage_can_id;

DROP TABLE IF EXISTS um_storage_user_id;

DROP TABLE IF EXISTS pwc_object_info;
```

Results

Your PostgreSQL database is prepared for the upgrade of VMware Cloud Director Object Storage Extension to VMware Cloud Director Object Storage Extension 1.5.

Migrate VMware Cloud Director Object Storage Extension Data

To upgrade VMware Cloud Director Object Storage Extension to version 1.5, uninstall the earlier version of the software from the host machine and install the new RPM package. If you are upgrading from VMware Cloud Director Object Storage Extension version 1.0, you must also run a data migration script.

During the migration, VMware Cloud Director users are mapped to new identities in the underlying storage system. The migration script grants the same access permissions for buckets and objects that the users had before the migration. After the migration, users cannot change the access permissions for the migrated buckets and objects. For migrated vApps and catalogs, updating the share status is not possible.

Prerequisites

- Verify that you uninstalled the earlier versions of VMware Cloud Director Object Storage Extension from the host machine. See [Chapter 4 Uninstall VMware Cloud Director Object Storage Extension](#).
- Verify that you installed and configured VMware Cloud Director Object Storage Extension 1.5 on the host machine. See [Chapter 3 Installing and Configuring VMware Cloud Director Object Storage Extension](#).
- Verify that you prepared your database for the upgrade. See [Prepare the Database for Upgrade](#).
- If you use Cloudbian HyperStore, verify that you upgraded your Cloudbian HyperStore to version 7.1.6 or 7.2 and increased the maximum length of Cloudbian HyperStore user IDs from 64 bytes to 255 bytes. See [Before You Begin](#) and [Cloudbian Deployment Requirements](#).
- If you use Dell EMC ECS, verify that you installed and configured all required ECS components. See [ECS Deployment Requirements](#).

Procedure

- 1 Open an SSH connection to the VMware Cloud Director Object Storage Extension machine.
- 2 Migrate the existing data.

```
ose migration start
```

The migration script puts VMware Cloud Director Object Storage Extension services into maintenance mode and restarts the services upon a successful completion.

If necessary, you can restart the data migration operation. Rerun the same command and append the `--force` argument. Rerunning the script with the `--force` argument deletes the existing migration tasks and creates new ones.

Once the data migration starts, the system returns the following message: `Successfully started migrate tasks`. Upon a successful completion, the system returns the following message:

```
[Migration Task]
ID : task-ID
Status : COMPLETED
Progress : 100
StartDate : 2019-10-10T08:14:18.041+0000
EndDate : 2019-10-10T08:17:07.006+0000
Type Migration : success
Path Migration : success
Permission Migration : success
```

- 3 (Optional) Review the progress of data migration tasks.

```
ose migration show
```

The system returns the following:

```
[Migration Task]
ID : task-ID
Status : RUNNING
Progress : 66
StartDate : 2019-10-10T08:14:18.041+0000
EndDate : 2019-10-10T08:17:07.006+0000
Type Migration : success
Path Migration : success
Permission Migration :
+ 0838
...
+ bucket-name1
+ bucket-name2
- filename1.jpeg
- filename2.log
- filename3.cer
```

Results

Once data migration is complete, you can start using the new version of VMware Cloud Director Object Storage Extension.