

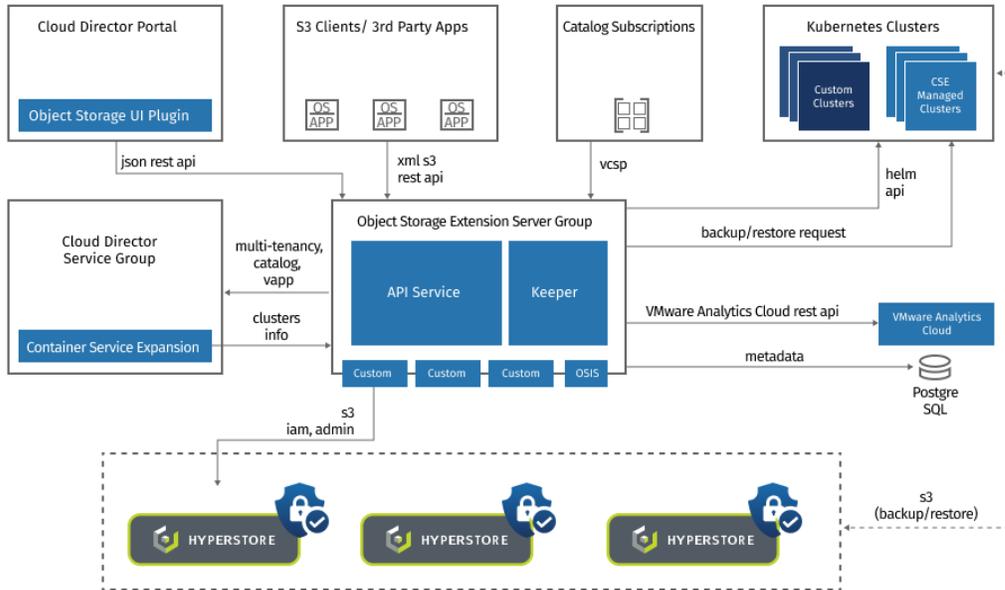
# Clouidian HyperStore - VMware vCloud Director Object Storage Extension

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## Introduction

VMware vCloud Director Object Storage Extension allows the integration between VMware vCloud Director and Cloudian HyperStore object storage. The purpose of the integration is to allow VCD customers to offer together with their IaaS also a SaaS model based on Cloudian HyperStore. The high-level architecture of this deployment is showed below:



VMware vCloud Director Object Storage Extension gets added as a plugin on vCloud Director and communicates simultaneously with the vCloud Director Server Group and the Cloudian HyperStore nodes to provide to vCloud users:

- HyperStore management capabilities from OSE UI and CMC (Provider Only)
- S3 service access with a user friendly S3 client built in
- S3 root credentials management and IAM credentials management
- Catalogs based on buckets
- Static vApps images storage on S3

To deploy the OSE Plugin please follow the official VMware documentation: <https://docs.vmware.com/en/VMware-Cloud-Director-Object-Storage-Extension/index.html>

### Note of S3 Domain Usage

As explained before the OSE acts as a bridge between Cloudian HyperStore and vCloud Director. Customers deploying this solution should also consider that in some scenarios it may be more beneficial to provide directly the S3 domain of Cloudian HyperStore to customers for external app integrations to provide the maximum throughput that the HyperStore cluster is capable of.

### HyperStore Multi-Region Deployments Support

Multi-region HyperStore deployments are also supported by vCloud Director Object Storage Extension allowing you to export the service also in multi-region mode to customers accessing the object storage service from vCloud Director.

## Integration Process

Requirements for your environment to proceed with the integration:

| Required Component             | Supported Version       |
|--------------------------------|-------------------------|
| vCloud Director (vCD)          | 10.4.2 through 10.5.1   |
| Object Storage Extension (OSE) | 2.2.x                   |
| Cloudian HyperStore (HS)       | From 7.4 branch upwards |

In this document we will go through the steps involved in setting up correctly and HyperStore environment to be integrated with VMware vCloud Director Object Storage Extension. These are the high-level steps to be performed:

1. Activate single sign-on (SSO) for the CMC service
2. Increase the maximum length of Cloudian HyperStore User IDs from 64 bytes to 255 bytes.
3. Activate shared buckets lists.
4. Activate HyperStore Identity and Access Manager.
5. Activate Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols on the S3 endpoint.

The document details how to configure HyperStore for VMware vCloud Director Object Storage Extension in two different ways one way for HyperStore Versions from 7.4.x to 7.5.x and another way is with HyperStore 8.x. The difference stands in how configuration parameters are managed between these different versions of HyperStore, please follow the appropriate part for your HyperStore version.

## Before You Start

As a first step is propaedeutic to identify in Cloudian HyperStore the pupper master host or the config controller primary host. These 2 different roles have the same scope, but they associate to two different HyperStore software branches, in versions of HyperStore prior 7.5.x we called the configuration host Puppet Master Host, wether in versions above HyperStore 8.x we call the configuration host Config Controller Primary host. It's fairly easy to identify in a cluster which node covers this role, connect to the CMC as System Admin and navigate to Cluster->Cluster Config in the section service information you will find:

### Puppet Master Host:

|  |   |
|--|---|
| PUPPET MASTER HOST:<br>geeodc-hs-node1 | PUPPET MASTER BACKUP HOST:<br>not installed |
|--|---|

### Config Controller Primary Host:

|  |   |
|--|---|
| CONFIG CONTROLLER PRIMARY HOST:<br>vcd-hs01-r1 | CONFIG CONTROLLER BACKUP HOST:<br>vcd-hs03-r1 |
|--|---|

The second preparation step involves connecting to the identified node and perform the following command:

```
hsctl config get admin.auth.password
```

This command collects the sysadmin user password, which is the password of the user able to manipulate HyperStore resources through the Admin API, as an example with this user and password and cURL calls, a user is able to create HyperStore groups or users. This is needed by the VMware Cloud Director Object Storage Extension to create Storage Policies, Groups and Users on HyperStore.

Take note on this password because it will be needed during the step “2. Configure the connection to the Cloudian HyperStore Admin Service HTTPS API endpoint” of the VMware Cloud Director Object Storage Extension documentation in the section “Configure VMware Cloud Director Object Storage Extension with Cloudian HyperStore”.

Please proceed to the next section of the document, select the appropriate section for your HyperStore version, this is key to a successful integration and deployment.

## Configuration for HyperStore versions from 7.4.x to 7.5.x

### a. Activate single sign-on (SSO) for the CMC service

SSO enabled for the CMC service is needed for the automatic login from OSE to the HyperStore System admin user of a logged in Provider admin on vCloud. To enable the SSO functionality on the CMC edit the following file:

```
/etc/cloudian-7.5.1-puppet/manifests/extdata/common.csv
```

If your HyperStore cluster has HSH enabled execute the following command to edit the common.csv file:

```
$ hspkg config -e common.csv
```

First enable the SSO service by changing the following value from false to true:

```
cmc_sso_enabled=true
```

In the same file you will need to change 1 additional variable:

```
cmc_sso_shared_key=ss0sh5r3dk3y
```

The above parameter is key for a secure deployment, it's recommended to use at least 16 characters they can be alphanumeric and symbols. The maximum documented length it's 64 characters. Take note of this key it will be needed during the step “5. Configure the connection to the Cloudian Management Console” of the OSE official documentation in the webpage “Configure VMware Cloud Director Object Storage Extension with Cloudian HyperStore”. Keep common.csv open and move to the next section of the document.

### b. Increase the maximum length of Cloudian HyperStore User IDs from 64 bytes to 255 bytes

When you enable a vOrg on vCloud to use the object storage service from the Object Storage Extension, the latter is going to automatically deploy a matching Group (Tenant) on Cloudian HyperStore, this one will be named with the ID of the vOrg. Since the ID of the vOrg is a long alphanumeric string, you need to change the value of the following variable in the common.csv from 64 bytes to 255 bytes to be able to accommodate for the entire string to be used:

```
cloudian_userid_length=255
```

Now you can write the changes to the common.csv file and close the document.

### c. Activate shared buckets lists

Enable the HyperStore AWS S3 API extension that allows an S3 user to list all the buckets that have been shared with him or her, enabling this allows you to see the Shared Buckets directly within OSE from each user in the Buckets menu. To do it open the following file:

```
/etc/cloudian-7.5.1-puppet/modules/cloudians3/templates/mts.properties.erb
```

If your HyperStore cluster has HSH enabled execute the following command to edit the common.csv file:

```
$ hspkg config -e mts.properties.erb
```

Search for the following value and change the value from false to true:

```
cloudian.s3.enablesharedbucket=true
```

Commit the changes to the configuration file and close it. Move on the next steps.

**Note for Clouidian HyperStore SW update:** when proceeding with an HyperStore software update process this variable it's the only one that will get disabled in the update process, to prevent this first check the file `cloudian-merge-conflicts-<timestamp>.txt` that will get generated during the software update process. If you find the variable mentioned in that .txt file, simply repeat the same step for the new HyperStore version configuration files.

#### d. Activate HyperStore Identity and Access Manager

This is stated in the VMware OSE docs as a necessary step to integrate Clouidian HyperStore, however since version 7.2 the IAM service is enabled by default on clusters. What's important is that the IAM domain associated to your cluster is correctly resolved by DNS to the VIP of the load balancer. The load balancer needs to correctly have TCP port 16443 balanced on all the nodes.

#### e. Activate Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols on the S3 endpoint

By default, from v. 7.4 of HyperStore the Object Storage platform gets deployed with self-signed certificates for the S3 service. We suggest for production to swap the certificates and put CA-signed ones, to do so follow Clouidian HyperStore official documentation at the point: "Importing a CA-Signed Certificate". **If you follow this procedure, you will also activate the previous settings, just proceed to the section Restart the services to apply the configurations.**

### Push the changed configurations in the cluster with Puppet

After you've edited configuration file templates on the Configuration Puppet Master you can use the HyperStore installer to trigger a Puppet sync-up:

1. After logging into the Configuration Master node as root, change into your installation staging directory (`/opt/cloudian-staging/7.x.x`). Once in the staging directory, launch the HyperStore installer:

```
./cloudianInstall.sh
```

If you are using the HyperStore Shell (HSH) as a Trusted user, from any directory on the Configuration Master node you can launch the installer with this command:

```
$ hspkg install
```

Once launched, the installer's menu options (such as referenced in the steps below) are the same regardless of whether it was launched from the HSH command line or the OS command line.

2. Enter "2" for Cluster Management. This displays the Cluster Management menu.
3. Enter "b" for Push Configuration Settings to Cluster. You can press enter to run configuration update on all your HyperStore hosts.
4. After the Puppet run completes for all the agents (and a success message displays on the console), move to the next section: **Restart the services to apply the configurations.**

## Restart the Services to Apply the Configurations

After the puppet push of the changed configuration succeeded you can use the HyperStore installer to restart the affected services: CMC and S3:

1. After logging into the Configuration Master node as root, change into your installation staging directory (/opt/cloudian-staging/7.x.x). Once in the staging directory, launch the HyperStore installer:

```
./cloudianInstall.sh
```

If you are using the HyperStore Shell (HSH) as a Trusted user, from any directory on the Configuration Master node you can launch the installer with this command:

```
$ hspkg install
```

Once launched, the installer's menu options (such as referenced in the steps below) are the same regardless of whether it was launched from the HSH command line or the OS command line.

2. Enter "2" for Cluster Management. This displays the Cluster Management menu.
3. From the Cluster Management menu, enter "c" for Manage Services. This displays the Service Management menu.
4. Enter "5" for S3 service management on all the nodes. Enter "restart".
5. Once the S3 service restart ended successfully on all the nodes enter "9" for CMC service management on all the nodes. Enter "restart".

Now the HyperStore system is ready to be integrated with VMware vCloud Director Object Storage Extension, continue to follow the official VMware documentation for a successful deployment of the VMware plugin.

## Configuration for HyperStore Versions from 8.x

### a. Activate single sign-on (SSO) for the CMC service

SSO enabled for the CMC service is needed for the automatic login from OSE to the HyperStore System admin user of a logged in Provider admin on vCloud. To enable the SSO functionality on the CMC perform the following step:

```
hsctl config set cmc.sso.enabled=true
```

Additionally, you need to change the shared security key for hash creation, consider that this is key for a secure deployment, it's recommended to use at least 16 characters they can be alphanumeric and symbols. The maximum documented length it's 64 characters. Take note of this key it will be needed during the step "5. Configure the connection to the Cloudian Management Console" of the OSE official documentation in the webpage "Configure VMware Cloud Director Object Storage Extension with Cloudian HyperStore". To change the key, perform the following step:

```
hsctl config set cmc.sso.sharedKey=<your key goes here>
```

To apply what was just changed perform the following steps:

```
hsctl config apply cmc
hsctl service restart cmc --nodes=ALL
```

### **b. Increase the maximum length of Clodian HyperStore User IDs from 64 bytes to 255 bytes**

When you enable a vOrg on vCloud to use the object storage service from the Object Storage Extension, the latter is going to automatically deploy a matching Group (Tenant) on Clodian HyperStore, this one will be named with the ID of the vOrg. Since the ID of the vOrg is a long alphanumerical string you need to apply the following configuration change from 64 bytes to 255 bytes to be able to accomodate for the entire string to be used:

```
hsctl config set common.user.name.maxLength=255
hsctl config apply common
hsctl service restart s3 cmc --nodes=ALL
```

### **c. Activate shared buckets lists**

Enable the HyperStore AWS S3 API extension that allows an S3 user to list all the buckets that have been shared with him or her, enabling this allows you to see the Shared Buckets directly within OSE from each user in the Buckets menu. To achieve this configuration change, perform the following commands:

```
hsctl config set s3.sharedBucket.enabled=true
hsctl config apply s3
hsctl service restart s3 --nodes=ALL
```

### **d. Activate HyperStore Identity and Access Manager**

This is stated in the VMware OSE docs as a necessary step to integrate Clodian HyperStore, however since version 7.2 the IAM service is enabled by default on clusters. What's important is that the IAM domain associated to your cluster is correctly resolved by DNS to the VIP of the load balancer. The load balancer needs to correctly have TCP port 16443 balanced on all the nodes.

### **e. Activate Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols on the S3 endpoint**

By default, from v. 7.4 of HyperStore the Object Storage platform gets deployed with self signed certificates for the S3 service. We suggest for production to swap the certificates and put CA-signed ones, to do so follow Clodian HyperStore official documentation at the point: "Importing a CA-Signed Certificate".

**Now the HyperStore system is ready to be integrated with the VMware vCloud Director Object Storage Extension, continue to follow the official VMware documentation for a successful deployment of the VMware plugin.**