How to Deploy vCenter on the HX Data Platform

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vCenter on HyperFlex

Cisco HX Data Platform deployment, including installation and cluster configuration and management, requires a vCenter server for day-to-day operations. Typically, vCenter is hosted on a server that is outside of (external to) the HX storage and compute cluster.

Important The recommended and preferred HyperFlex configuration is to have vCenter on a server external to the HX storage cluster. See the *Cisco HyperFlex Systems Installation Guide for VMware ESXi* for complete HyperFlex installation and configuration information.

For those environments where you cannot dedicate an external physical server to the vCenter server application, you can install a vCenter VM on the HX storage cluster.

This document describes how to deploy and run an HX Data Platform configuration that has a vCenter VM running on the HX storage cluster, rather than on a server external to the HX storage cluster. When a vCenter VM is hosted on a HyperFlex cluster, it is referred to as a nested vCenter. The vCenter VM can be either a VMware vCenter Server Appliance (VCSA) or a Microsoft Windows vCenter on a Windows Server VM.

There are two methods for installing a vCenter VM on an HX storage cluster:

- **Installing a vCenter VM as part of the HX Data Platform installation**

  This method allows you to install a vCenter VM after the HX storage cluster is installed. It does not require any additional hardware as compared to the second option.

- **Using a vCenter VM stored on an external server**

  This method uses the typical and recommended external vCenter to install and configure the HX Data Platform and storage cluster, and then migrates the vCenter server to reside on the HX storage cluster.

  In this context, external server means a server that is not included in the HX storage cluster. For example, it could be on an NFS mount.

Requirements

The nested vCenter method requires:

- HX Data Platform Installer version 2.6(1a) or later. Prior HX Data Platform versions are not supported.
- vCenter to be installed inside a VM.
- Compute-only nodes may be added post installation only after the HX storage cluster is registered to a vCenter server.

- Cluster expansion with additional HyperFlex nodes may be performed only after the HX storage cluster is registered to a vCenter server.
- When installing vCenter, select the embedded Platform Services Controller option. An external Platform Services Controller is not supported.

Known Constraints

When vCenter is installed on a VM within the HX Data Platform storage cluster, there are some vCenter-related limitations:

- For remote office / branch office (ROBO) deployments using Cisco HyperFlex Edge, you may use either deployment method.
- Nested vCenter on a stretched cluster deployment is not supported.
- Deploying Stretched Cluster without an instance of vCenter is not supported.
- vCenter has limited auto-start capability.

  vCenter installed on a VM in the HX storage cluster does not always automatically restart. See Recovering an HX Storage Cluster after a vCenter Shutdown, on page 10.

  - If the HX storage cluster is properly configured for high availability (HA), vCenter automatically restarts if the node that hosts it fails.
  - If the entire HX storage cluster suffers a power interruption, HA does not restart vCenter and manual intervention is needed.
  - If the HX storage cluster is gracefully brought down, manually initiate vCenter power-on from the last local ESXi host to which it was registered.

- As each HyperFlex node is brought down during a rolling upgrade, the vCenter VM migrates automatically if DRS is enabled. If DRS is not enabled, the vCenter VM must be manually migrated during upgrades.
- Only online upgrade is supported while hosting a nested vCenter. Do not use the offline upgrade option.
- When the HX storage cluster is down or must shut down, then any support-related operations completed through vCenter, must be performed directly on ESXi hosts.
- Do not take a snapshot of the vCenter VM due to certain limitations. For further details, refer to the VMware KB article, VMware VirtualCenter Server service fails due to a quiesced snapshot operation on the vCenter Server database virtual machine (2003674).

  This applies to scheduled snapshots and one-time-only snapshots. Do not schedule snapshots for a folder or resource pool that includes the vCenter VM.

- Snapshots cannot be deleted when the HX storage cluster is in the ENOSPACE state.

  Deleting snapshots is frequently used to reclaim space for an HX storage cluster. When an HX storage cluster enters ENOSPACE, the VMs hosted on that HX storage cluster can no longer perform writes. This includes the vCenter VM. Therefore, the vCenter hosted on the HX storage cluster cannot perform actions. This includes deleting snapshots to help bring the storage cluster out of ENOSPACE. Use an ESXi host command-line option to delete snapshots.

- HX snapshot of nested vCenter is not supported.

Install a vCenter VM as Part of the HX Data Platform Installation

To Install a vCetnter VM as part of the HX Data Platform Installation, complete the following:

1. Meet the Requirements and understand the Known Constraints.
2. Install and configure the HX Data Platform and HX Storage Cluster (Nested vCenter) using one of the following options:
   - **HX Data Platform Installer** - Continue to the Install and Configure HX Data Platform and HX Storage Cluster (Nested vCenter) via HX Data Platform Installer , on page 3 section of this document.
   - **Cisco Intersight** - Continue to the Install and Configure HX Data Platform and HX Storage Cluster (Nested vCenter) via Cisco Intersight , on page 4 section of this document.
3. Install a vCenter VM on the HX Storage Cluster, on page 5.

Install and Configure HX Data Platform and HX Storage Cluster (Nested vCenter) via HX Data Platform Installer

Perform the following steps to install a nested vCenter on an HX storage cluster using the Cisco HX Data Platform Installer.

Procedure

Step 1 Verify that your system meets the HX Data Platform system requirements.

Step 2 Log in to the HX Data Platform Installer. If needed, read and accept the End User License Agreement.

Step 3 On the **Workflow** page, select **Cluster Creation with HyperFlex (FI)** or **Cluster Creation with HyperFlex Edge**, and click **Continue**.

Step 4 On the **Credentials** page, enter the UCS Manager (only FI workflow) and HX Data Platform (hypervisor) credentials, and click **Continue**.

Leave all three vCenter fields blank. The vCenter server is registered as a post-installation task.

Step 5 When prompted to confirm that the installation is being started without a vCenter, click **Continue**.

Step 6 On the **Server Selection** page, select the servers under **Unassociated** to include in the HX storage cluster, and click **Continue**.

Step 7 (Only FI workflow) On the **UCS Manager Configuration** page, enter the UCS Manager configuration information, and click **Continue**.

UCS Manager configuration information includes the VLAN, MAC pool, subnet, gateway, iSCSI storage, FC storage, UCS firmware, HyperFlex cluster name, and org name. Fill out these fields normally as required for any HyperFlex storage cluster.

Step 8 (Only FI workflow) On the **Hypervisor Configuration** page, enter common hypervisor settings, such as subnet mask, gateway, DNS server, static IP addresses, and hostnames for the HyperFlex nodes, and click **Continue**.

Step 9 On the **IP Addresses** page, for each HyperFlex node, complete the listed fields for Hypervisor Management, Data IP addresses, subnet masks, and gateways. For the IP addresses, specify the network that the IP address should belong to (Data Network and Management Network).

Step 10 On the **Cluster Configuration** page, enter the HX storage cluster settings, such as HX storage cluster name, controller VM credentials, Data Replication Factor, DNS and NTP servers, and Auto Support (ASUP). **Skip** the vCenter configuration inputs and leave the fields blank.

See the *Cisco HyperFlex Systems Installation Guide for VMware ESXi* for complete deployment and cluster creation steps.

Step 11 Click **Start**.
A **Progress** page displays the progress of various configuration tasks.

Caution Do not skip validation warnings without a complete understanding of the triggered issue.

See the "Warnings" section of *Cisco HyperFlex Systems Installation Guide for VMware ESXi* for more details.

Step 12 When cluster creation completes and the summary page displays, click **Launch HyperFlex Connect** to launch the Cisco HyperFlex Connect user interface, and log in with credentials for local/root (username) and the controller VM password that you used on the **Cluster Configuration** page.

What to do next

Proceed to Install a vCenter VM on the HX Storage Cluster, on page 5.

Install and Configure HX Data Platform and HX Storage Cluster (Nested vCenter) via Cisco Intersight

Perform the following steps to install a nested vCenter on an HX storage cluster using the Cisco HX Data Platform Installer.

Procedure

Step 1 Verify that your system meets the HX Data Platform system requirements.

Step 2 Log in to the Cisco Intersight with CEC Credentials or with SSO.

Step 3 In the **Devices Details** page, select **Claim a New Device** and claim the servers you will deploy in the cluster. For additional information, see See the Cisco HyperFlex Systems Installation Guide for Cisco Intersight, Chapter: Deploying HyperFlex Edge Cluster.

Step 4 In the left navigation panel, click **Profiles**.

Step 5 In the **Profiles** page, make sure that the **HyperFlex Cluster Profiles** tab is selected and click **Create HyperFlex Cluster Profile** to launch the Create HX Cluster Profile installation wizard. by selecting Create HyperFlex Cluster Profile.

a) Complete the following fields: **Organization**, **Name**, **HX Date Platform Version**, **Type** radio button, select **Cisco HyperFlex Edge**, and optional **Tags** and **Description**.

Step 6 Click **Next**.

Step 7 In the **Cluster Configuration** Page, complete the following fields: **Security**, **DNS**, **NTP**, and **Time Zone**. Leave the **vCenter Configrutaion** field blank.

Note HyperFlex will be deployed without being registered in vCenter. The vCenter Server is registered as a post-installation task. Configure the following fields as needed: **Storage Configuration**, **Auto Support**, **IP Host**, **Network Configuration**, **Proxy Setting** and **Hyperflex Storage Network Policies**.

Step 8 In the **Nodes Assignment** page, you can assign nodes now or optionally, you can choose to assign the nodes later. To Assign nodes, click the **Assign nodes** check box and select the node you want to assign.

Step 9 Click **Next**.

Step 10 In the **Nodes Configuration** page, you can view the IP and Hostname settings that were automatically assigned. Additionally, you can enter the **Cluster Management IP Address** and the **MAC Prefix Address**. Enter the MAC address prefix range in the form of 00:25:B5:XX. The cluster management IP address must belong to the management subnet.

Step 11 In the **Summary** page, you can view the cluster configuration and node configuration details. Review and confirm that all information entered is correct. Ensure that there are no errors triggered under the **Errors/Warnings** tab.

Step 12 Click **Validate and Deploy** to begin the deployment. Optionally, click **Validate**, and click **Save & Close** to complete deployment later. The **Results** page displays the progress of the various configuration tasks.

What to do next

Proceed to Install a vCenter VM on the HX Storage Cluster.

Install a vCenter VM on the HX Storage Cluster

Install a vCenter VM on the HX storage cluster only after completing your install and configuration via Installing and Configuring HX Data Platform and HX Storage Cluster (External vCenter) or Install and Configure HX Data Platform and HX Storage Cluster (Nested vCenter) via Cisco Intersight .

Before you begin

You must have the following to perform this task:

- HX Data Platform fully installed with an HX storage cluster created
- VMware vCenter installer files (VCSA ISO or Windows installer executable)

Procedure

Step 1 Log in to HX Connect.

Step 2 Click **Dashboard** > **Datastores** > **Create Datastore**, enter **Datastore Name** (for example, **VC-DS01**, **Size**, and **Block Size**, and click **Create Datastore**.

On the **Datastores** page, the new datastore must display as **MOUNTED** before continuing.

Step 3 Using the vCenter installer wizard, deploy a new vCenter to any of the HyperFlex servers in the cluster.

Use the new datastore for persistent storage and select an appropriate port-group for the network. This port-group must have network access to the HyperFlex cluster management IP address and all ESXi management IP addresses.

Step 4 After successfully deploying vCenter, log in to the vSphere Web Client using a supported browser and do the following:

a) Create a new datacenter; for example, **DC1**.

b) Create a new cluster in the new datacenter (for example, **Cluster1**) leaving HA and DRS disabled. They are enabled after running the `post_install` script.

c) Depending on which VMware vSphere ESXi version you are running:

If running VMware vSphere version ESXi 6.5 or earlier, manually add all HyperFlex servers to the newly created vCenter cluster.

If running VMware vSphere version ESXi 6.7 or later, first add the HyperFlex node to the destination datacenter and then move into it to the newly created vCenter cluster.

d) Log out of the vSphere Web Client using the option in the top-right menu.

Step 5 Register the HX storage cluster to the newly configured vCenter server:

a) Log in to any controller VM using `ssh`, and run the following command:

```
stcli cluster reregister --vcenter-datacenter <DC Name> --vcenter-cluster <Cluster Name>
  --vcenter-url <URL or IP of vCenter> --vcenter-user <admin username>
```

Note Run this command on any controller VM only once. After successfully running the command, log in to the vSphere Web Client and verify that the HX Data Platform Plug-in displays in the extension list.

The following sample command shows successful output:

```
root@SpringpathControllerE1M9XZGRFM:~# stcli cluster reregister --vcenter-datacenter
Edge --vcenter-cluster HX-01 --vcenter-url 10.1.1.70 --vcenter-user
administrator@vsphere.local

Reregister StorFS cluster with a new vCenter ...

Enter NEW vCenter Administrator password:***********
Cluster reregistration with new vCenter succeeded
```

b) After successfully running the command, log in to vSphere Web Client and verify the HX Data Platform Plug-in displays in the extension list.

Step 6 Run the `post_install` script from the installer VM and follow the prompts. For more information, see Post Installation Tasks in the *Cisco HyperFlex Systems Installation Guide for Cisco Intersight*.

This script sets up certain additional cluster settings, including vMotion.

Step 7 Create DRS pin rules.

These steps place the vCenter VM on a known host making troubleshooting and manual restart easier. You may need to search for the vCenter VM on all hosts to perform any manual steps, such as, bringing up the vCenter VM after a full shutdown. See VMware documentation for additional information.

Note If you are using a license that does not support DRS, you do not need to perform this step.

a) Click ***cluster*** > **Manage** > **Settings** > **Configuration** > **VM/Host Groups**.
b) Click **Add**, and select Type: **VM group**.
c) Click **Add**, select the vCenter VM, click **OK**, and click **OK** again.
d) Click **Add**, select Type: **Host group**, add an ESXi host, click **OK**, and click **OK** again.
e) Click **VM/Host Rules**, and select Type: **Virtual Machines to Hosts**.
f) Select the VM group created earlier, select **Should run on hosts in group**, select the Host group created earlier, and click **OK**.
g) Configure the vSphere HA Advanced Options parameter das.respectvmhostsoftaffinityrules.

Note This parameter determines if vSphere HA enforces VM-VM anti-affinity rules. The default value is "true" and rules are enforced even if vSphere DRS is not enabled. In this case, vSphere HA does not fail over a virtual machine if doing so violates a rule, but it issues an event reporting there are insufficient resources to perform the failover. This option can also be set to "false", whereby the rules are not enforced.

Deploying vCenter on HyperFlex Using an External Server

Complete the following tasks.

1. Meet the Requirements, on page 1 and understand the Known Constraints, on page 2.
2. Installing and Configuring HX Data Platform and HX Storage Cluster (External vCenter), on page 7.

   This is the standard HX Data Platform installation and deployment using an external vCenter that is on a VM.
3. Migrating a vCenter VM to an HX Storage Cluster from an External Server, on page 8.

Installing and Configuring HX Data Platform and HX Storage Cluster (External vCenter)

Installing and configuring HX Data Platform and deploying the HX storage cluster using a vCenter server that is external to the HX storage cluster is the standard deployment method.

This task follows the standard HyperFlex installation and configuration described in *Cisco HyperFlex Systems Installation Guide for VMware ESXi*.

Procedure

Step 1 Verify that your system meets the HX Data Platform system requirements.

Step 2 Log in to the HX Data Platform Installer. If needed, read and accept the End User License Agreement.

Step 3 On the **Workflow** page, select **Cluster Creation**, and click **Continue**.

Step 4 On the **Credentials** page, enter the UCS Manager, vCenter, and HX Data Platform (hypervisor) credentials, and click **Continue**.

Step 5 On the **Server Selection** page, select the servers under **Unassociated** to include in the HX storage cluster, and click **Continue**.

Step 6 On the **UCS Manager Configuration** page, enter the UCS Manager configuration information, and click **Continue**.

UCS Manager configuration information includes the VLAN, MAC pool, subnet, gateway, iSCSI storage, FC storage, UCS firmware, HyperFlex cluster name, and org name. Fill out these fields normally as required for any HyperFlex storage cluster.

Step 7 On the **Hypervisor Configuration** page, enter common hypervisor settings, such as subnet mask, gateway, DNS server, static IP addresses, and hostnames for the HyperFlex nodes, and click **Continue**.

Step 8 On the **IP Addresses** page, for each HyperFlex node, complete the listed fields for Hypervisor Management, Data IP addresses, subnet masks, and gateways. For the IP addresses, specify the network that the IP address should belong to (Data Network and Management Network).

Step 9 On the **Cluster Configuration** page, enter the HX storage cluster settings, such as HX storage cluster name, controller VM credentials, Data Replication Factor, vCenter information, DNS and NTP servers, and Auto Support (ASUP).

See the *Cisco HyperFlex Systems Installation Guide for VMware ESXi* for complete deployment and cluster creation steps.

During this process, point the HX Data Platform Installer to the vCenter VM installed on the external source. This vCenter continues to run during HX Data Platform installation.

Step 10 Click **Start**.
A **Progress** page displays the progress of various configuration tasks.

Caution Do not skip validation warnings without a complete understanding of the triggered issue.

See the "Warnings" section of *Cisco HyperFlex Systems Installation Guide for VMware ESXi* for more details.

Step 11 Run the `post_install` script from the installer VM and follow the prompts. For more information on running the `post install` script, see Run Post Installation Script in the *Cisco HyperFlex Systems Installation Guide for VMware ESXi, Release 4.0*.

This script sets up certain additional cluster settings, including vMotion.

What to do next

Proceed to Migrating a vCenter VM to an HX Storage Cluster from an External Server, on page 8.

Migrating a vCenter VM to an HX Storage Cluster from an External Server

This task assumes that you completed the standard HX Data Platform deployment, which includes installing the HX Data Platform Installer and configuring the UCS Manager and ESXi host. You can find instructions in Installing and Configuring HX Data Platform and HX Storage Cluster (External vCenter), on page 7 from this tech note or the *Cisco HyperFlex Systems Installation Guide for VMware ESXi*.

Before you begin

You must have the following to perform this task:

- HX Data Platform fully installed with an HX storage cluster created
- vCenter in a VM on an external server

Procedure

Step 1 From the HX Data Platform Plug-in, create a new HyperFlex datastore; for example, **ds1**.

Step 2 Perform storage vMotion from the current external location to a new HyperFlex datastore through vCenter.

If the CPU families between the source and destination hosts are compatible, perform a manual vMotion of the vCenter VM. This option does not require that the vCenter is powered off.

Otherwise, complete the following steps. See VMware KB article Moving a virtualized vCenter Server virtual machine between ESXi/ESX hosts with different processor types (2058684).

a) Connect directly to the external ESXi server hosting the vCenter VM.
b) Power off the vCenter VM.
c) Click **File** > **Export** > **Export OVF Template**.
d) Connect directly to any HyperFlex ESXi server.
e) Click **File** > **Deploy OVF Template**.
f) Power on the vCenter VM.

Step 3 If not already done, configure vMotion interfaces to allow DRS to move VMs.

a) Log in to vSphere, and view **Networking**.

   From **vSphere Home**, click **vCenter Inventory Lists Resources** > **Resources** > **Hosts** > ***host*** > **Manage** > **Networking** > **VMKernel adapters**.

b) Click the **Add host networking** icon.

   Through the **Add Networking** wizard:

   1. Select **VMKernel Network Adapter**, and click **Next**.
   2. Select an existing standard switch, click **Browse**, select the **Switch**, select **vMotion**, and click **OK**.
   3. Enter a **Network label name**, define the proper **VLAN ID**, accept **TCP/IP stack** as the default unless you require L3 for your vMotion network, check **vMotion traffic**, and click **Next**.
   4. Enter a static IPv4 address, click **Next**, and click **Finish**.

Step 4 Create DRS pin rules.

These steps place the vCenter VM on a known host making troubleshooting and manual restart easier. You may need to search for the vCenter VM on all hosts to perform any manual steps, such as, bringing up the vCenter VM after a full shutdown. See VMware documentation for additional information.

Note If you are using a license that does not support DRS, you do not need to perform this step.

a) Click ***cluster*** > **Manage** > **Settings** > **Configuration** > **VM/Host Groups**.
b) Click **Add**, and select Type: **VM group**.
c) Click **Add**, select the vCenter VM, click **OK**, and click **OK** again.
d) Click **Add**, select Type: **Host group**, add an ESXi host, click **OK**, and click **OK** again.
e) Click **VM/Host Rules**, and select Type: **Virtual Machines to Hosts**.
f) Select the VM group created earlier, select **Should run on hosts in group**, select the Host group created earlier, and click **OK**.
g) From the **VM/Host Rules** > **vSphere HA Rule Settings** section, click **Edit**.
h) Check **vSphere HA should respect VM to Host affinity rules during failover**.

Shut Down Nested vCenter

This section captures the procedure to shutdown a nested vCenter within a cluster.

Procedure

Step 1 Shutdown all User VMs on a cluster.

Step 2 Shutdown vCenter.

Step 3 Note down the name of host on which vCenter is running, as the vCenter VM must be manually started later.

Step 4 Stop Storfs on all controllers for HXDP version 4.5 and later.

```
priv stop storfs
For 4.0x HXDP versions and earlier
  stop storfs
```

Step 5 Manually power off stCTLVMs from all ESXi hosts.

Step 6 Put all individual hosts in maintenance mode, by running the following command:

```
esxcli system maintenanceMode set -e true
```

Step 7 Shutdown the ESX hosts.

Step 8 Boot up the ESX hosts.

Step 9 Exit all hosts from maintenance mode, by running the following command:

```
esxcli system maintenanceMode set -e false
```

Step 10 Manually start the stCTLVMs (as vCenter is down, they may not start automatically).

Step 11 Verify if Storfs is running on each controller, by running the following command:

```
# pidof storfs
```

If the `pidof` command does not return any output, start Storfs by running the following command:

```
For HXDP version 4.5 and later
priv start storfs
For HXDP versions 4.0x and earlier
start storfs
```

Step 12 From the controller, check for the cluster status by running the following command:

```
sysmtool --ns cluster --cmd info
```

Wait for cluster to be healthy.

Step 13 Power on vCenter from the host (use the host name note down in step 3).

Wait for vCenter to be up. Check if the cluster is healthy by running the following command:

```
stcli cluster info  | grep -A 1 vCluster
```

After vCenter is up and running, you will get a state of online from this command.

Note If the `stcli cluster storage-summary command` fails and the cluster is in the healthy state, start the cluster using the `stcli cluster start` command.

Step 14 Power on all User VMs.

Recovering an HX Storage Cluster after a vCenter Shutdown

Typically, if vCenter shuts down or is forced to shut down, it automatically restarts. However, when the vCenter VM is hosted on an HX Data Platform node, manual steps may be required to completely recover the HX storage cluster.

Recovering an HX Storage Cluster after a Power Loss

Procedure

Step 1 Power on the ESXi hosts.

ESXi hosts power on the VMs on the servers, including the controller VMs.

Step 2 Verify the HX storage cluster is online from the HX Data Platform perspective:

- Verify that the HX datastores are available on the ESXi host.
- From the ESXi host command line, run the following command.

```
# sysmtool --ns cluster --cmd info
```

Step 3 Power on the vCenter VM and wait for it to be ready.

To verify that the vCenter VM is ready, log in to the vSphere Web Client in a browser.

Step 4 Log in to the controller VM, and run the following command to verify the HX storage cluster is online.

```
# stcli cluster info
```

Example response

```
vCluster:
state : online
```

Recovering an HX Storage Cluster after an Administrative Shutdown

In some shutdown and failure scenarios, the vCenter VM may remain powered on but in an unresponsive state due to an offline HX storage cluster. It is important to completely power off the vCenter VM and bring the HX storage cluster online before restarting the vCenter VM.

Procedure

Step 1 Locate the `vmid` of the vCenter VM on the ESXi host.

```
# vim-cmd vmsvc/getallvms
```

Step 2 Power off the vCenter VM using the `vmid`.

```
# vim-cmd vmsvc/power.off <vmid>
```

Step 3 Log in to the controller VM and run the following command to recover the HX storage cluster from the HX Data Platform perspective.

```
# stcli cluster start
```

Step 4 Verify the HX storage cluster is online from the HX Data Platform perspective:

- Verify that the HX datastores are available on the ESXi host.
- From the ESXi host command line, run the following command.

```
# sysmtool --ns cluster --cmd info
```

Step 5 Power on the vCenter VM and wait for it to be ready.

To verify that the vCenter VM is ready, log in to the vSphere Web Client in a browser.

Step 6 Log in to the controller VM, and run the following command to verify the HX storage cluster is online.

```
# stcli cluster info
```

Example response

```
vCluster:
state : online
```

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