Cluster Expansion—Compute-only Nodes

Overview

You can add converged or compute-only nodes to expand a Hyper-V cluster. Below is the list of supported converged and compute-only nodes in Hyper-V clusters.

- **Converged Nodes**—HX220c M5, HX240c M5, HX220c AF M5, HX240c AF M5
- **Compute-only Nodes**—B200 M5, B200 M4 Blade Servers, and C220 M5 C-Series Rack Servers

The following procedure describes adding **compute-only** nodes to expand a Hyper-V cluster. This expansion workflow includes Windows OS installation and is not performed as part of cluster creation using HX Installer. To expand Hyper-V clusters with converged nodes, refer to Cluster Expansion—Converged Nodes.

Pre-expansion Checklist

To add **compute-only** nodes to expand your Hyper-V cluster, complete the following pre-expansion checklist that summarizes key requirements, considerations and tasks.

Note The following check-list applies to Cisco HX Release 4.5(x) and later.

Requirement/Task	Description	
Supported Versions and Platforms	**HX Data Platform**	3.5(2a) and later **Important** If your cluster is running on releases earlier than 3.5(2a), ensure that you upgrade your existing cluster to 3.5(2a) at the minimum.
	Compute-only Nodes and Storage Options	**Attention** UCS B200 M5 blade servers with M.2 SATA drives. HW RAID M.2 (UCS-M2-HWRAID and HX-M2-HWRAID) is not supported on Compute-only nodes. UCS B200 M4 blade servers with local SAS or Fibre Channel SANs.
	Windows ISO	Customer provided Windows 2016 Datacenter edition ISO.
Maximum Compute to Converged ratio	1:1	
Maximum Cluster Size	A single cluster can have a maximum of 32 nodes.	
Network Speed	Mixing network speeds between compute-only nodes and HyperFlex converged nodes is not recommended. For example, if the existing network connectivity of the converged nodes is 40 GbE, then the compute-only nodes should also be connected at 40 Gb speeds.	
Determine Boot Disk Connection	Based on your topology, and the type of compute-only nodes that you want to add, choose one of the following expansion scenarios: • Cluster Expansion for UCS M5 blade servers with M.2 SATA drives, or UCS M4 blade servers with Local SAS drives **Note** HW RAID M.2 (UCS-M2-HWRAID and HX-M2-HWRAID) is not supported on Compute-only nodes. • Cluster Expansion for UCS M4 blade servers with Fibre Channel	

Requirement/Task	Description
Boot Disk Capacity	Ensure that you have only ONE boot disk of size **greater than 240GB** during Windows OS installation. After cluster expansion is complete, you may choose additional disks.
Stage HyperFlex Driver Image	The **Windows ISO** and **HyperFlex Driver image** files must be placed on a shared location (such as HX Installer) that is reachable from Cisco UCS Manager and the out-of-band subnet. Use the following steps to download and host the HyperFlex Driver Image and Windows ISO in a shared location within the installer VM **Note** Windows is configured to boot to UEFI mode starting Cisco HX Release 4.5 and later. **Note** These steps apply to both **Windows Server 2016** and **Windows Server 2019**. **1.** Copy the HyperFlex Driver Image. For example, run the following command: **rsync -avzP /opt/springpath/packages/latest.img /var/www/localhost/images/install.img** **2.** Mount the HyperFlex Driver Image. For example, run the following command: **mkdir -p /mnt/install-img && mount -o loop,rw /var/www/localhost/images/install.img /mnt/install-img** **3.** Copy the answer file specific files for your Windows Server Version and run the following command: **Windows Server 2016** **cp /opt/springpath/packages/FactoryUnattendXML/WindowsServer2016/Autounattendxmluefi /mnt/install-img/Autounattend.xml** **Windows Server 2019** **cp /opt/springpath/packages/FactoryUnattendXML/WindowsServer2019/Autounattendxmluefi /mnt/install-img/Autounattend.xml** **4.** Unmount the HyperFlex Driver Image. For example, run the following command: **umount /mnt/install-img** **Note** You cannot install Windows Server 2019 or 2016 on SD cards. **Note** The DiskID referenced in autounattend.xml should correctly point to the local disk on the compute node where the OS is installed.

Requirement/Task	Description
Multipathing with Fibre Channel SAN	Do NOT use multipathing with Fibre Channel SANs.
Fabric Interconnect Support	Compute-only node expansion is supported only when the compute node are on the same Fabric Interconnects.

Cluster Expansion - M5 Blade Servers (M.2 SATA) or M4 Blade Servers (Local SAS Drives)

Procedure Overview

The Hyper-V cluster expansion procedure for adding **UCS M5 Blade Servers (M.2 SATA) Or M4 Blade Servers (Local SAS Drives)** consists of the following sequence of tasks:

1. Pre-expansion Checklist, on page 1
2. Cisco UCS Manager Configuration, on page 4
3. Microsoft OS Installation, on page 10
4. Hypervisor Configuration, HXDP Software Installation and Cluster Expansion, on page 19
5. Perform the following post installation steps:
   - Configuring a Static IP Address for Live Migration and VM Network
   - (Optional) Post Installation Constrained Delegation
   - Configure Local Default Paths
   - Checking the Windows Version on the Hyper-V Host

Cisco UCS Manager Configuration

The following procedure describes configuring Cisco UCS Manager using HX Installer.

Step 1 Log into the HX Data Platform Installer using the following steps:

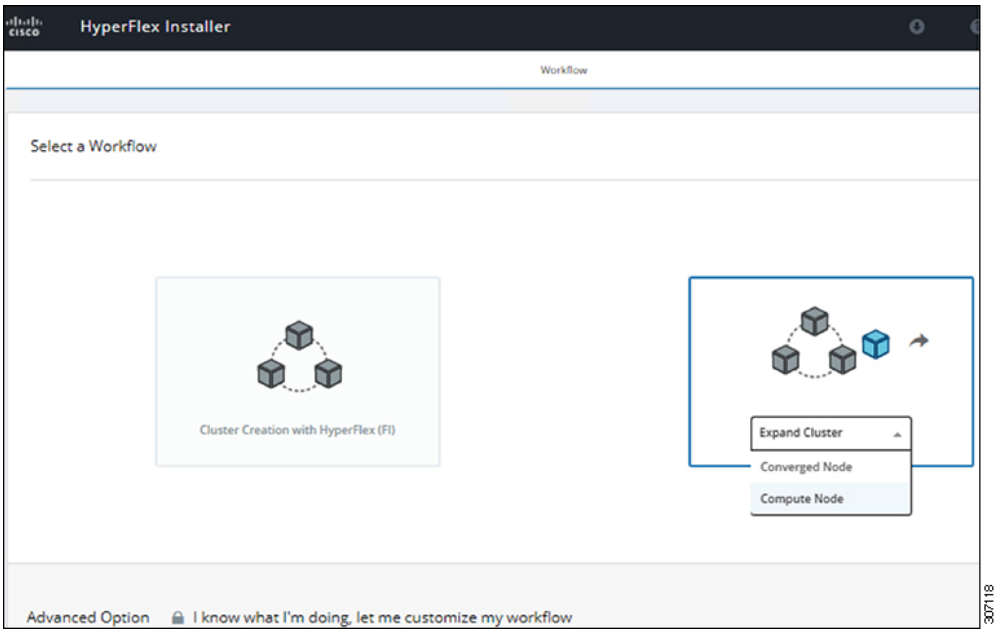
a) In a browser, enter the URL for the VM where HX Data Platform Installer was installed.

b) Use the credentials: `username`: root, `password`: Cisco123

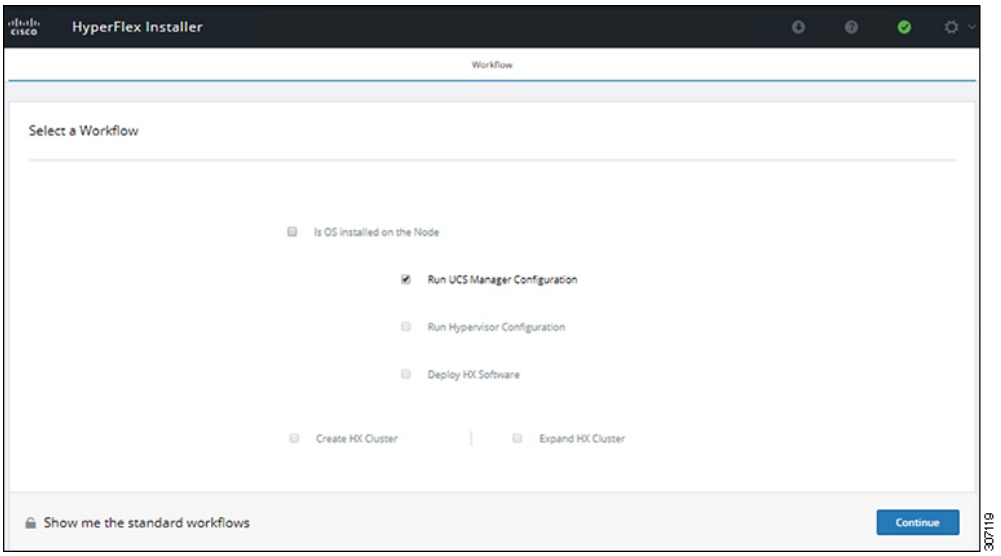
Important Systems ship with a default password of `Cisco123` that must be changed during installation. You cannot continue installation unless you specify a new user supplied password.

c) Read the EULA. Click **I accept the terms and conditions**. Click **Login**.

Step 2 In the **Select a Workflow** page, select **Expand Cluster** > **Compute Node**.

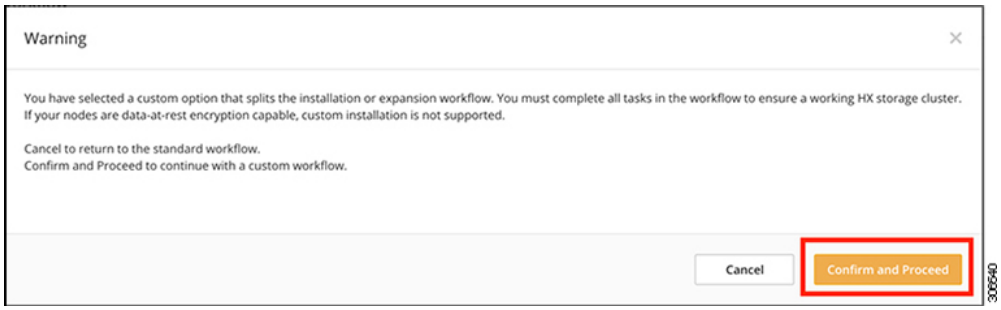


Step 3 In the next screen, click **Run UCS Manager Configuration** and then **Continue**.



Caution Do not choose any other workflow option at this point.

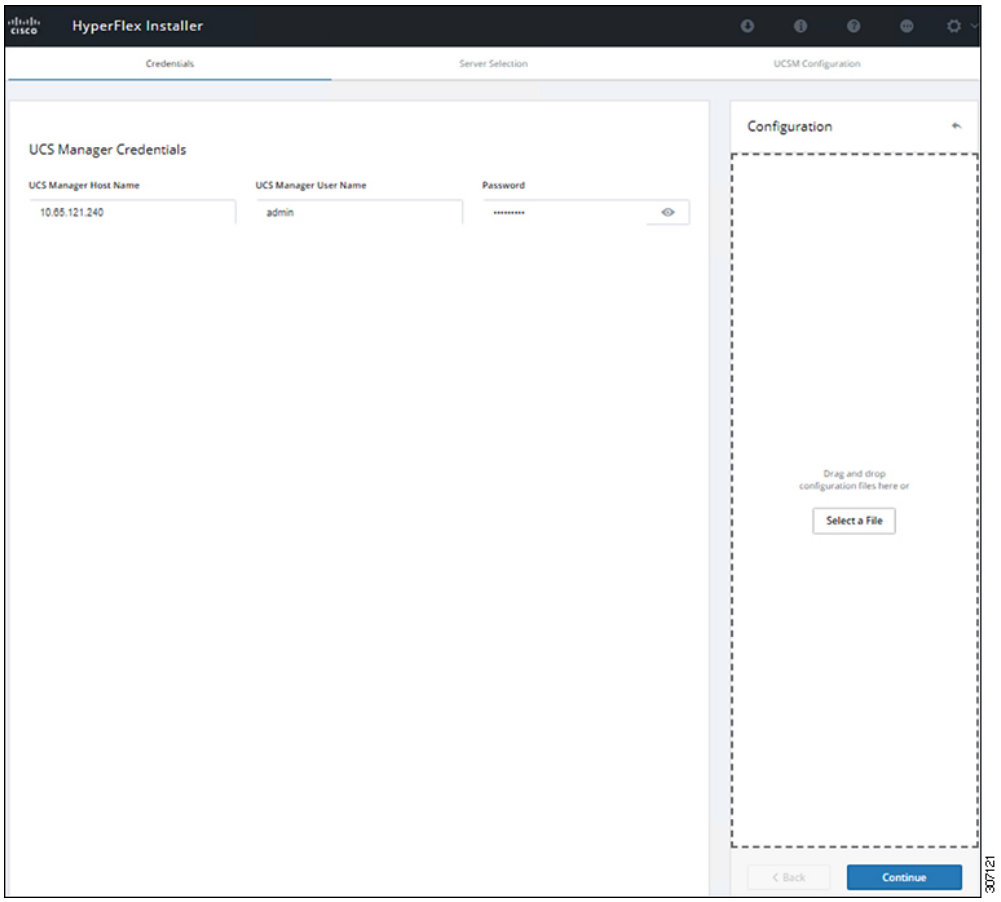
Step 4 Click **Confirm** in the pop-up that displays.



Step 5 In the **Credentials** page, complete the following fields for UCS Manager.

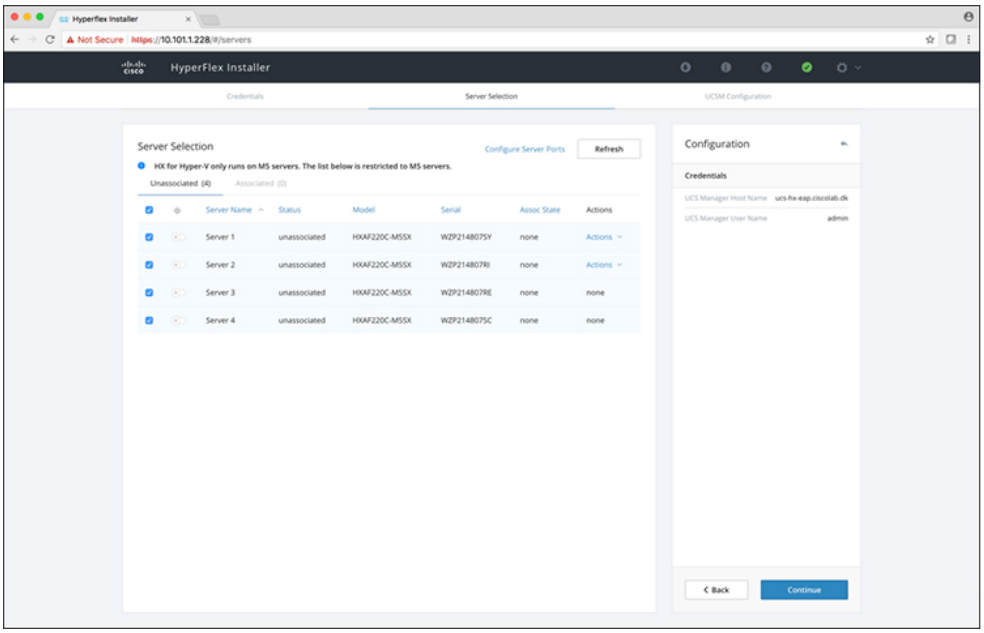
Field	Description
UCS Manager Host Name	FQDN or the VIP address of the UCS Manager.
UCS Manager User Name and Password	Administrator user and password or a user with UCS Manager administrative privileges.

Use the following illustration as a reference for entering values in this page.



Click **Continue** to proceed. The installer will now try to connect to the UCS Manager and query for available servers. The configuration pane will be populated as the installer progresses. After the query finishes a screen with the available servers is displayed.

Step 6 In the **Server Selection** page, choose all the servers that you want to install in the cluster and click **Continue**.

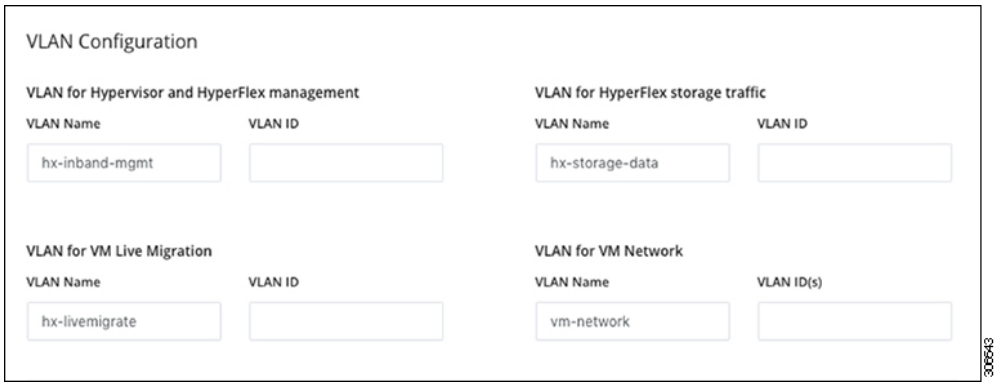


Step 7 In the **UCSM Configuration** page, complete the following fields for **VLAN Configuration**.

HyperFlex needs to have at least 4 VLANs to function, each needs to be on different IP subnets and extended from the fabric interconnects to the connecting uplink switches, to ensure that traffic can flow from the Primary Fabric Interconnect (Fabric A) to the Subordinate Fabric Interconnect (Fabric B).

Name	Usage	ID
hx-inband-mgmt	Hyper-V and HyperFlex VM mgmt.	10
hx-storage-data	HyperFlex storage traffic	20
hx-livemigrate	Hyper-V Live Migration network	30
vm-network	VM guest network	100,101

Use the following illustration as a reference for entering values in this page.



Note
- Do not use VLAN 1 as it is not best practice and can cause issues with disjoint layer 2.
- vm-network can be multiple VLANs added as a comma separated list.

Caution Renaming the 4 core networks is not supported.

Step 8 Enter the remaining network configuration for MAC Pool, 'hx' IP Pool for Cisco IMC, Cisco IMC access management (Out of band or in band)

Field	Description	Value
MAC Pool		
MAC pool prefix	MAC address pool for the HX cluster, to be configured in UCSM by the installer. Ensure that the mac address pool isn't used anywhere else in your layer 2 environment.	00:25:b5:***xx***
'hx' IP Pool for Cisco IMC		
IP Blocks	The range of IP addresses that are used for Out-Of-Band management of the HyperFlex nodes.	10.193.211.124-.127
Subnet Mask	The subnet mask for the Out-Of-Band network	255.255.0.0
Gateway	The gateway address for the Out-Of-Band network	10.193.0.1
Cisco IMC access management (Out of band or In band)		
In band (recommended) Out of Band	Select the option that was used for converged-nodes cluster creation.	

Note
- The Out-Of-Band network needs to be on the same subnet as UCS Manager.
- You can add multiple blocks of addresses as a comma separated line.

Important If you choose to expand your Hyper-V cluster using **M4 blade servers with FC SAN** boot option, you must enable FC Storage. Complete the fields for FC Storage.

Table 1: (Optional) Applicable for M4 blade servers with FC SAN

Field	Description	Example Value
FC Storage	Checkbox that indicates if FX Storage should be enabled.	Check to enable FC Storage
WWxN Pool	A WWN pool that contains both WW node names and WW port names. For each fabric interconnect, a WWxN pool is created for WWPN and WWNN.	20:00:25:B5:C2
VSAN A Name	The name of the VSAN for the primary fabric interconnect (FI-A). By default, this is set to hx-ext-storage-fc-a.	hx-ext-storage-fc-a
VSAN A ID	The unique identifier assigned to the network for the primary fabric interconnect (FI-A).	70
VSAN B Name	The name of the VSAN for the subordinate fabric interconnect (FI-B). By default, this is set to hx-ext-storage-fc-b.	hx-ext-storage-fc-b
VSAN B ID	The unique identifier assigned to the network for the subordinate fabric interconnect (FI-B).	70

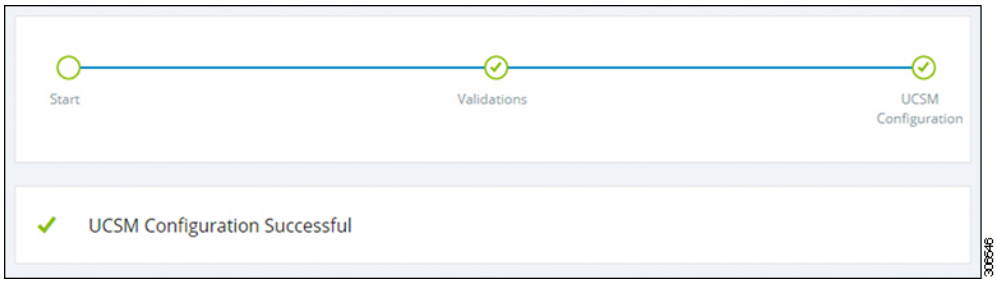
Step 9 **Advanced Section**

Field	Description	Example Value
UCS Firmware Server Version	Choose the appropriate UCS Server Firmware version.	3.2(3a)
HyperFlex Cluster Name	This user defined name will be used as part of the service profile naming In UCSM for easier identification.	

Field	Description	Example Value
Org Name	The org. name is used for isolating the HX environment from the rest of the UCS platform to ensure consistency.	HX-Cluster1

Step 10 When you click **Start**, the installer validates your input and then begins configuring UCS Manager.

Step 11 When the HX Data Platform Installer is finished, then you are ready to proceed to next step.



Microsoft OS Installation

For Microsoft OS installation, you will need to first configure a vMedia policy in Cisco UCS Manager to map the following two image files:

- Customer provided **Windows 2016 Datacenter edition ISO** or **Windows Server 2019 Datacenter-Desktop Experience ISO**, and
- Cisco provided **Cisco HyperFlex Driver image**.

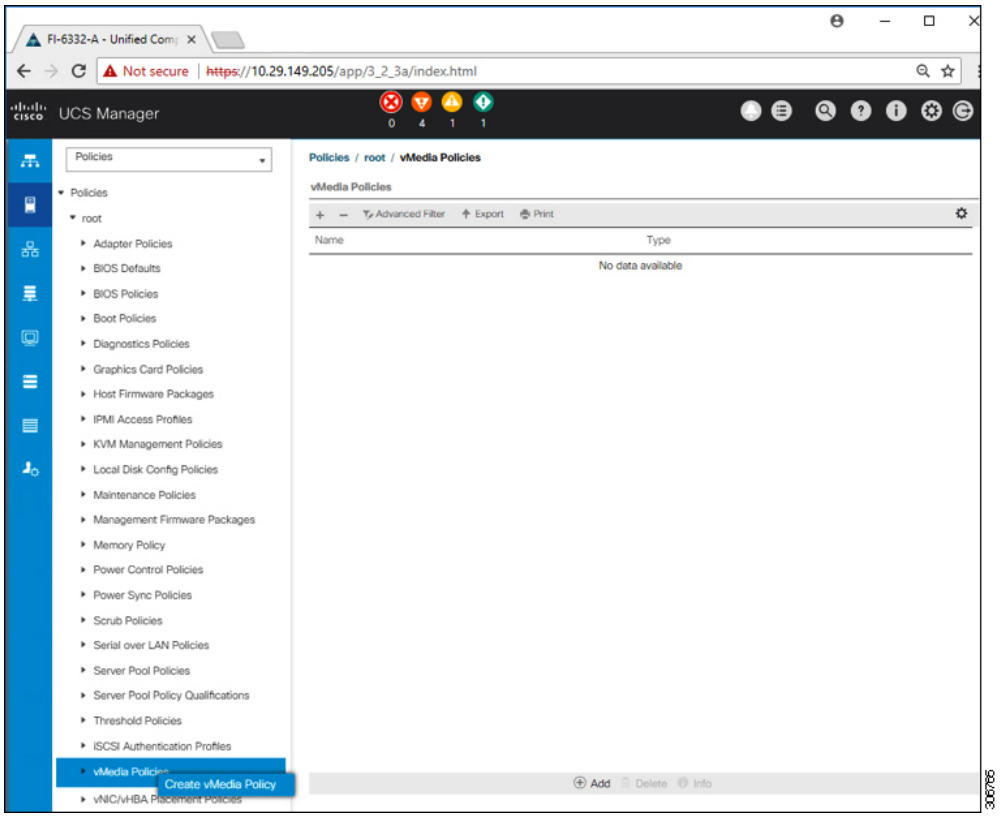
Note Ensure network connectivity exists between the fileshare and all server management IP addresses.

Step 1 **Launch Cisco UCS Manager**:

a) In your web browser, type the **Cisco UCS Manager** IP address.
b) Click **Launch UCS Manager**.
c) In the login screen, enter the with the username as **admin** and the password set in the beginning of the installation. Click **Log in**.

Step 2 **Create a vMedia policy for the Windows OS and Cisco driver images:**

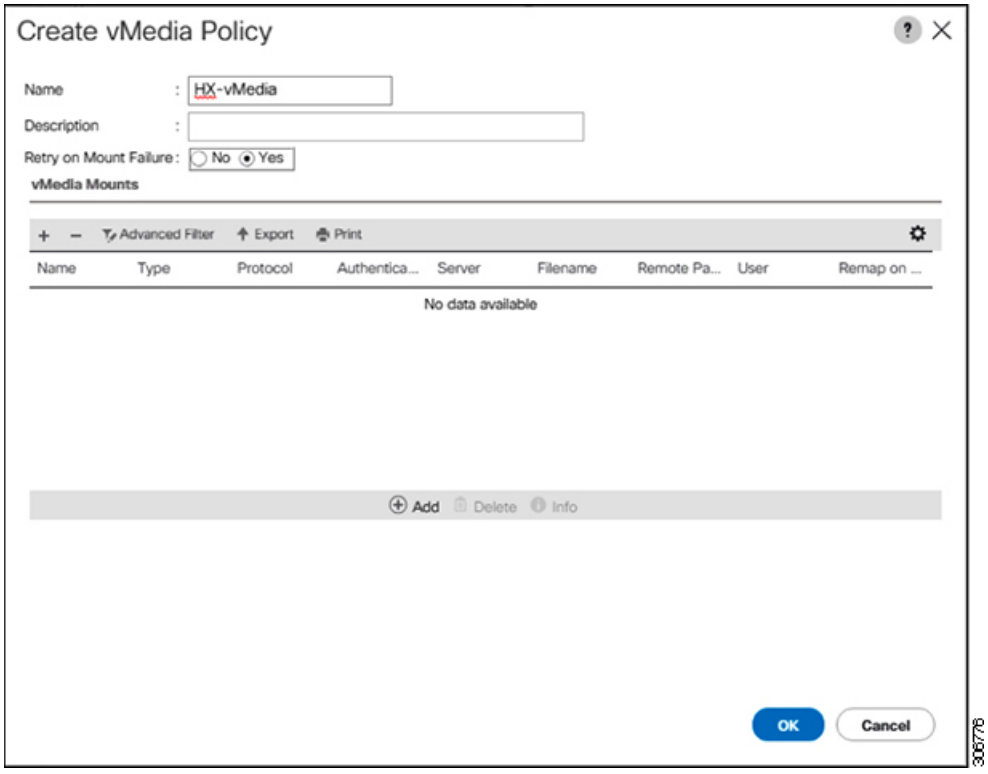
a) In the Navigation pane, click **Servers**.
b) Expand **Servers** > **Policies** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **vMedia Policies**
c) Right-click **vMedia Policies** and select **Create vMedia Policy HyperFlex**.



d) In the **Create vMedia Policy** dialog box, complete the following fields:

Field Name	Description
Name	The name of the vMedia policy. For example, *HX-vMedia*. This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
Description	A description of the policy. We recommend including information about where and when the policy should be used. Maximum 115 characters.
Retry on Mount Failure	Designates if the vMedia will continue mounting when a mount failure occurs. This can be: • **Yes** • **No** **Note** The default setting is **Yes**. When **Yes** is selected the remote server will continue to try to mount the vMedia mount process until it is successful, or you disable this option. If you select No, a warning message will appear indicating retry on mount failure will not work in case of mount failure.

Refer to the following screenshot as an example:

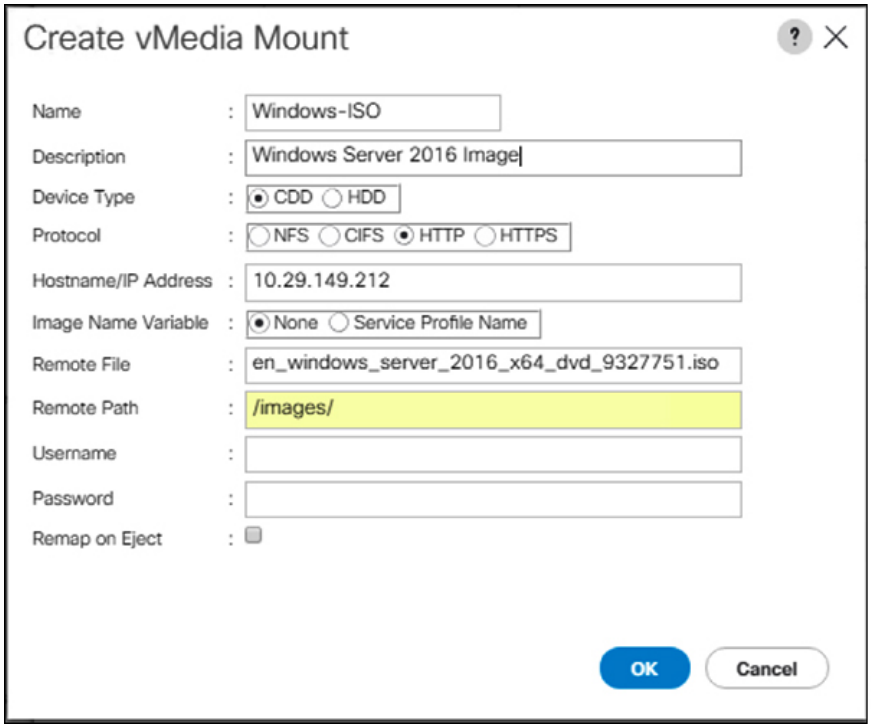


e) On the icon bar under the **vMedia Mounts** pane, click **+ Add**. In the **Create vMedia Mount** dialog box, complete the following fields:

Field Name	Description	Example Value
Name	Name for the mount point.	Windows-ISO
Description	Can be used for more information.	Windows Server 2016 image or Windows Server 2019 image
Device Type	Type of image that you want to mount. This can be: • **CDD**—Scriptable vMedia CD. • **HDD**—Scriptable vMedia HDD.	CDD
Protocol	The protocol used for accessing the share where the ISO files are located.	HTTP
Hostname/IP Address	IP address or FQDN of the server hosting the images.	10.101.1.92
Image Name Variable	This value is not used in HyperFlex installation.	None

Field Name	Description	Example Value
Remote File	The filename of the ISO file that you want to mount.	
Remote Path	The path on the remote server to where the file resides	
Username	If you use CIFS or NFS a username might be necessary	
Password	If you use CIFS or NFS a password might be necessary	

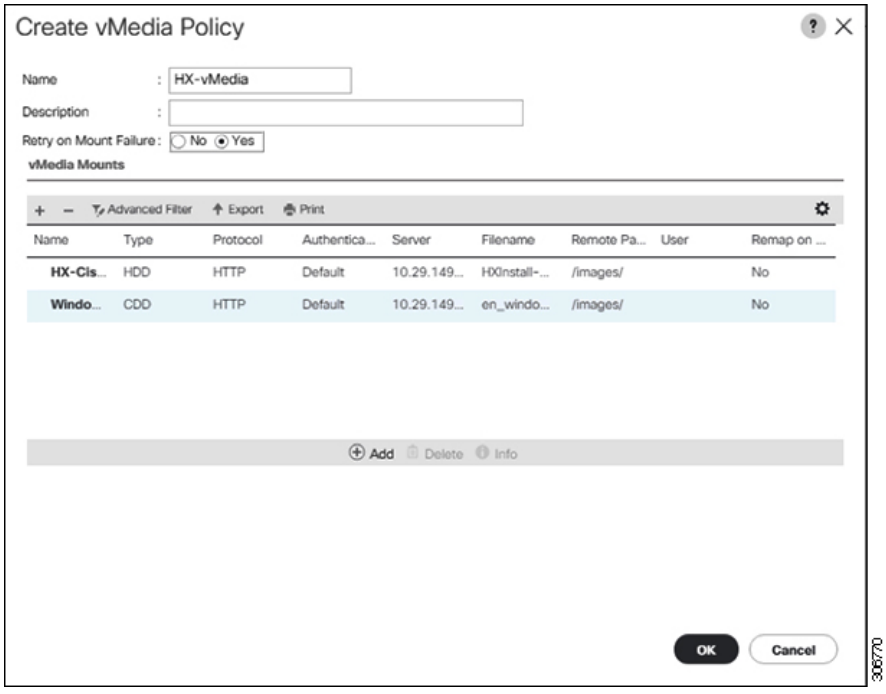
Refer to the screenshot below as an example:



f) Click **OK**. When you click **OK**, you will now be returned to the **vMedia Policies** screen, and you should see the information that you just submitted.

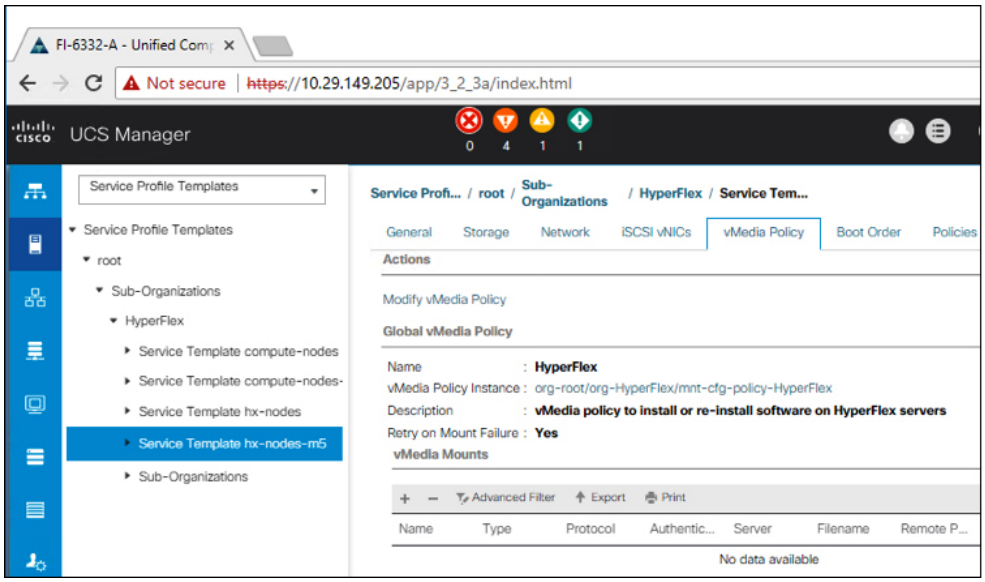
g) Repeat **Steps 2e and 2f**, however, change the type to **HDD** and the remote file name to the **Cisco HyperFlex driver image**.

h) At the end of this step, the two vMedia mounts will be listed in the Create vMedia Policy screen as shown in the following screenshot:



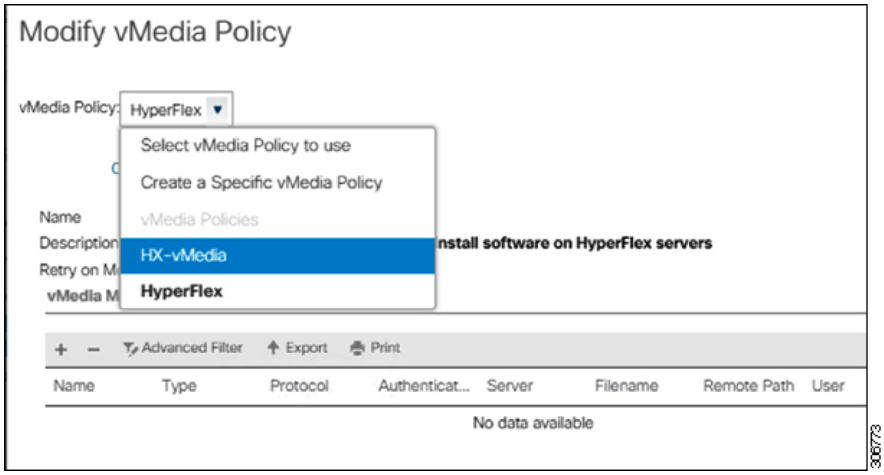
Step 3 **Associate the vMedia Policy to a Service Profile**:

a) In the Navigation pane, select **Servers** > **Service Profile Templates** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **Service Template *compute-nodes, or compute-nodes-m5***

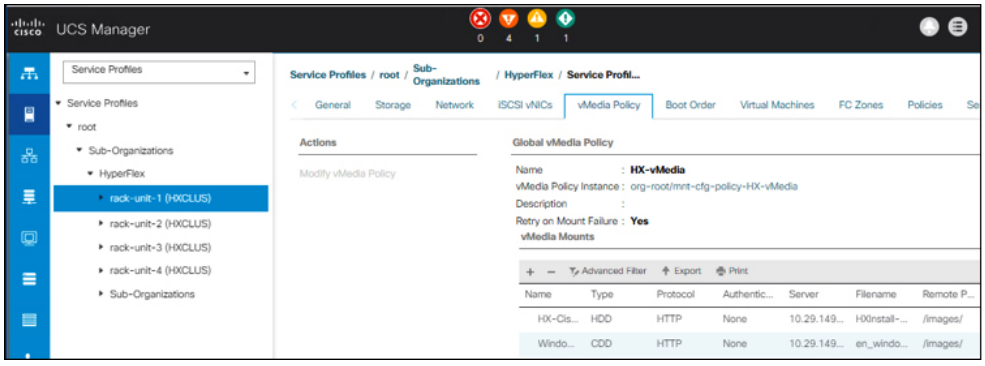


b) Click the **vMedia Policy** tab. Then, click **Modify vMedia Policy**

c) Choose the **vMedia Policy** that you created earlier from the drop-down selection, and click **OK** twice.



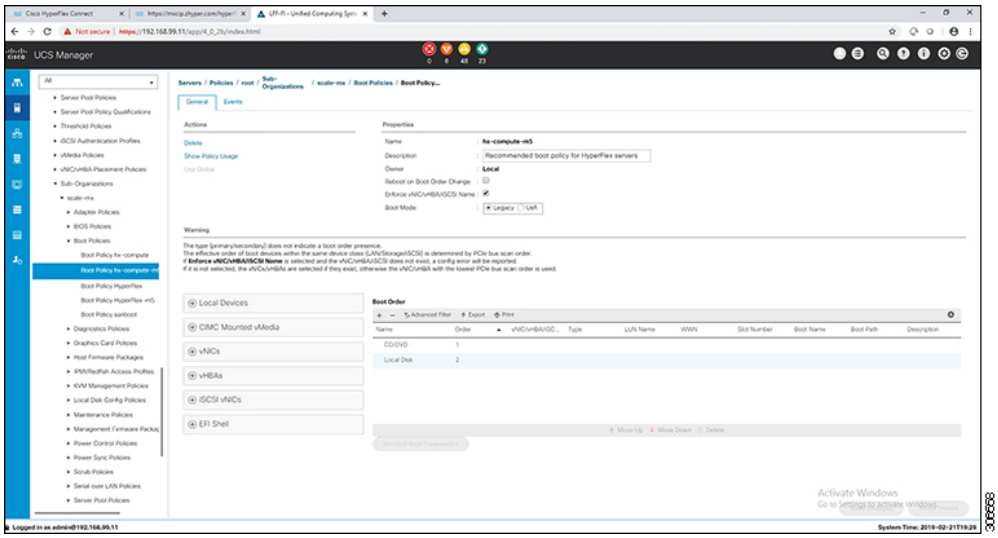
d) Under the **General** tab, verify that the vMedia policy is added to the Service Profile.



Step 4 **Modify Boot Policy and set the boot order to have CIMC CD/DVD to the list:**

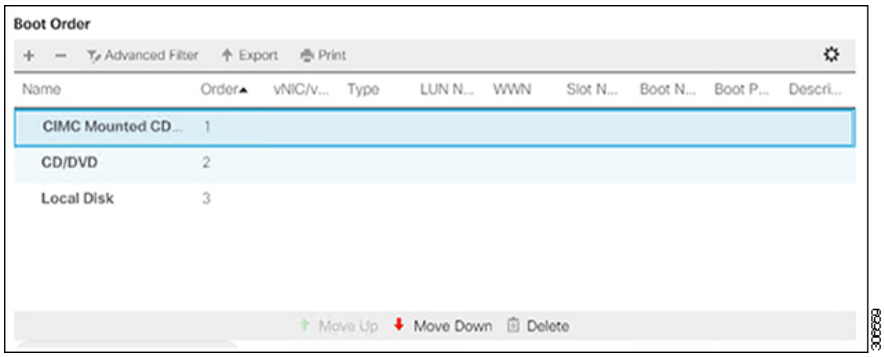
a) In the Navigation pane, click the **Servers** tab.

b) Expand **Servers** > **Policies** > **root** > > **Boot Policies** > ***hx-compute, or hx-compute-m5***



c) In the **Boot Order** configuration pane, click **CIMC Mounted CD/DVD** . Then, click **Add CIMC Mounted CD/DVD** to add this to the boot order. Move it to the top of the boot order using the **Move up** button.

Important As shown in the screenshot below, the **CIMC Mounted CD/DVD** option must be highest in the boot order preceding the other options, **Embedded Local Disk** and **CD/DVD**.

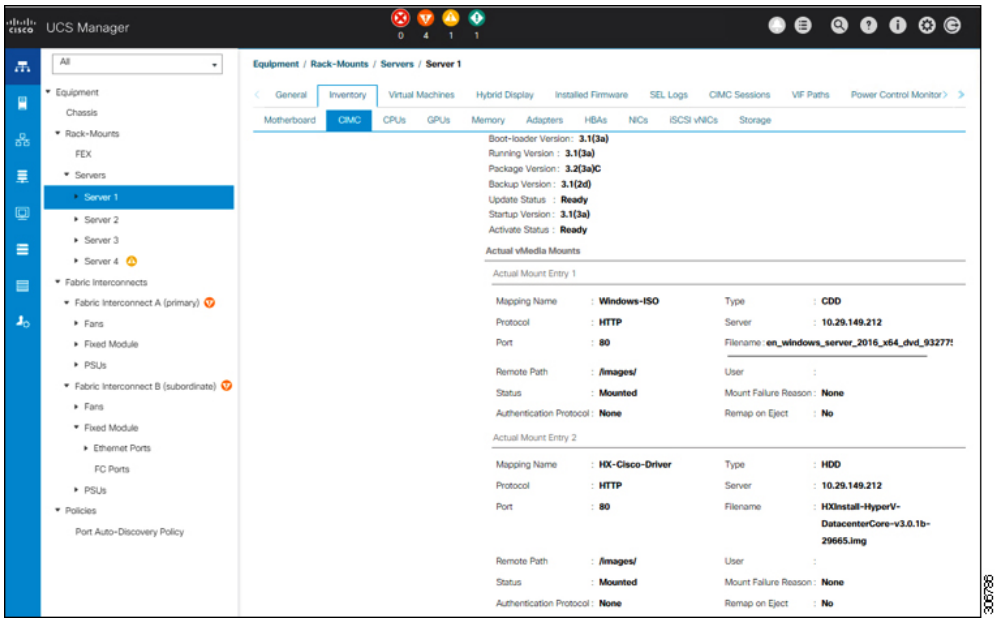


d) Click **Save Changes**, and click **OK** in the **Success** dialog box. The modified boot policy is saved.

Step 5 **Verify successful vMedia mounting:**

a) On the **Equipment** tab, select one of the servers.

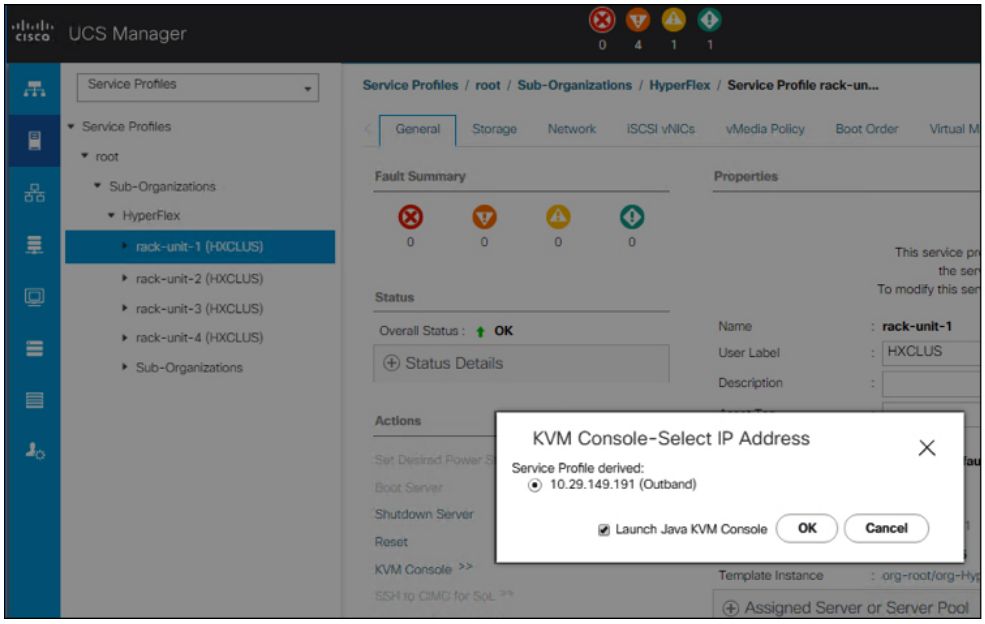
b) Click **Inventory** > **CIMC**, scroll down and ensure for mount entry #1(OS image) and mount entry #2 (Cisco HyperFlex driver image) you see status as **Mounted** and there are no failures.



c) In the menu bar, click **Servers** and choose the first HyperFlex service profile.

d) Click the **General tab** and choose **Actions** > **KVM Console>>**.

Note The KVM console will try to open in a new browser. Be aware of any pop-up blockers. Allow the pop-ups and re-open the KVM



e) Reboot the host, launch the KVM Console, and power on the server to monitor the progress of the Windows installation. You should see the **Loading Files** screen appear. Windows should install automatically without user intervention.

Note The option to install Windows automatically without user intervention is applicable for fresh or first-time installations only. For reinstallations, or if the node already contains a Windows partition, you will need to respond to the prompt to "Press any key to boot from CD/DVD".

You should see a blue screen and within a few moments you should see the **Setup is starting** message. The host will reboot a few times. If automated installation does not begin, double-check that both images are mounted to the server.

f) The installation is complete when you get a clear command prompt at `c:\users\administrator>`. This is applicable for both Windows Core and Desktop Experience installations. It may take several minutes for the Driver Image to be copied and installed.

Note Ignore the prompt with the **The system cannot find the file specified** message.

Important Ensure that you have completed **Steps e and f,** on ALL servers that will be part of the HX cluster.

Note If Microsoft Windows OS is already installed on the node, you must click **any** key to continue when the node boots back up so that the fresh OS installation can happen.

If you haven't clicked **any** key to continue, and an existing node with a previous OS installed is used to expand, then the new installation is skipped causing further expansion to fail.

g) Log into each server and verify the following:

Run the powershell command: `Get-ScheduledTask -TaskName HXInstallbootstraplauncherTask`. Verify that the HX Install Bootstrap Launcher task is running. Sample output as follows:

```
TaskPath                                 TaskName                          State
--------                                 --------                          -----
\                                        HXInstallbootstraplauncherTask    Running
```

Validate that the log line "Done with HX PostSysPrepSetup" exists in `C:\ProgramData\Cisco\HyperFlex\Install\Log\PostSysprepSetup.log`.

Run powershell command: `Get-Command Get-VMSwitch`. Verify that the command runs successfully (no exception). Sample output as follows:

```
CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Cmdlet          Get-VMSwitch                                       2.0.0.0    Hyper-V
```

Step 6 **Reset the vMedia policy back to the default HyperFlex policy:**

a) Update the vMedia policy for compute nodes. Go to **Servers** > **Service Profile Templates** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **Service Template** ***compute-nodes, or compute-nodes-m5***. Then, click on **Modify vMedia Policy**.

b) Under the vMedia Policy drop-down selection, choose "HyperFlex" policy.

Step 7 **Restore the boot order to the one before installation:**

a) In the Navigation pane, click the **Servers** tab.

b) Expand **Servers** > **Policies** > **root** > > **Boot Policies** > ***hx-compute, or hx-compute-m5***

c) In the **Boot Order** configuration pane, use the **Move Down** button to move **CIMC Mounted CD/DVD** option to the bottom of the list.

Step 8 **Change the local Administrator password to match the password on the existing cluster.**

a) Log into the newly-installed compute node.

b) Open a command prompt.

c) Run the following command: `net user Administrator <password>`.

Step 9 **Update the password for HXInstallbootstraplauncherTask and verify that it is Running:**

a) Stop the scheduled task "HXInstallbootstraplauncherTask" if it is running.

For example:

```
Get-ScheduledTask -TaskName "HXInstallbootstraplauncherTask" | Stop-ScheduledTask
```

b) Update task credentials.

For example:

```
Get-ScheduledTask -TaskName "HXInstallbootstraplauncherTask" | Set-ScheduledTask -User
"Administrator" -Password <password>
```

c) Start the scheduled task and verify that it is Running.

For example:

```
Get-ScheduledTask -TaskName "HXInstallbootstraplauncherTask" | Start-ScheduledTask

Get-ScheduledTask -TaskName "HXInstallbootstraplauncherTask"
```

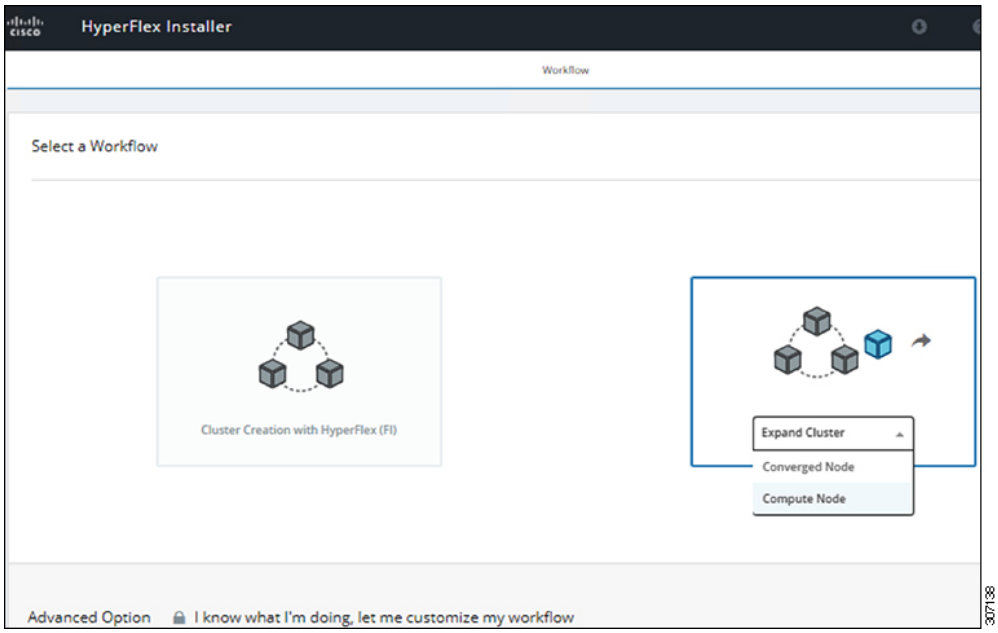
Hypervisor Configuration, HXDP Software Installation and Cluster Expansion

After the installation of Windows OS is completed, perform the following steps to configure the hypervisor, install the HX Data Platform Software and expand the cluster.

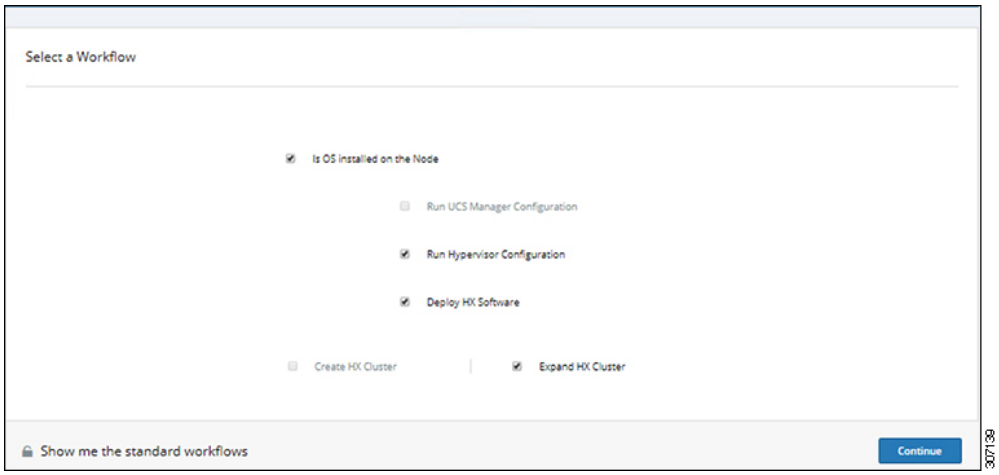
Step 1 **Re-open** the HX Data Platform Installer and log in.

Step 2 You might need to "start over" because the previous workflow was finished. Click on the gear icon in the top right corner and select **Start Over**.

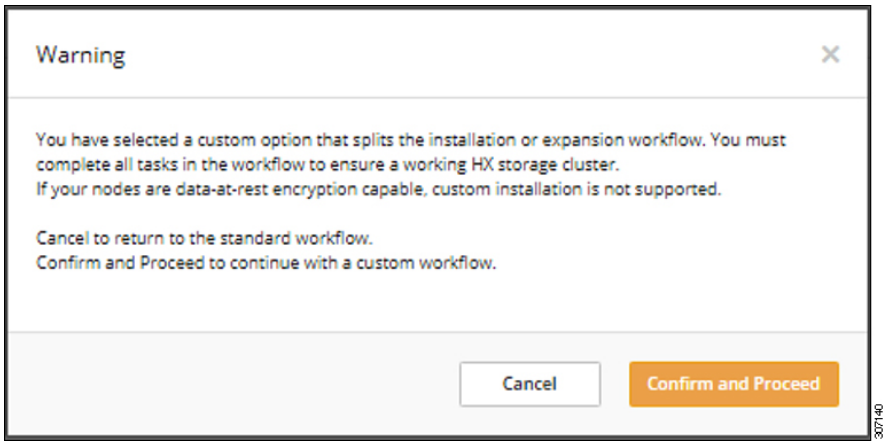
Step 3 In the **Select a Workflow** page, select **Expand Cluster** > **Compute Node**.



Step 4 In the **Select a Workflow** page, select **Expand HX Cluster**. Leave the **Is OS installed on the Node**, **Run Hypervisor Configuration** and **Deploy HX Software** checkboxes selected.

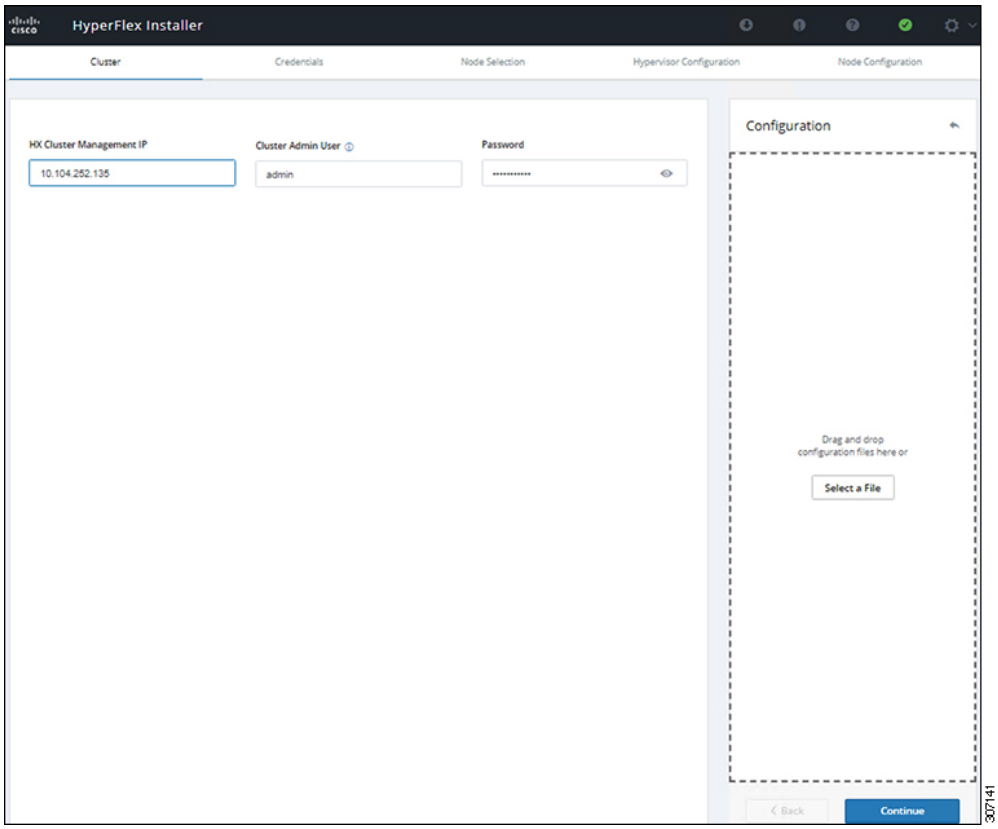


Step 5 In the **Warning** dialog box, click **Confirm and Proceed**.



Step 6 In the **Cluster** page, complete the following fields:

Field	Description	Example Value
HX Cluster Management IP	The management IP address for the HX cluster	10.104.252.135
Cluster Admin User	Administrator username	admin
Password	Administrator password	



Step 7 In the **Credentials** page, complete the following fields:

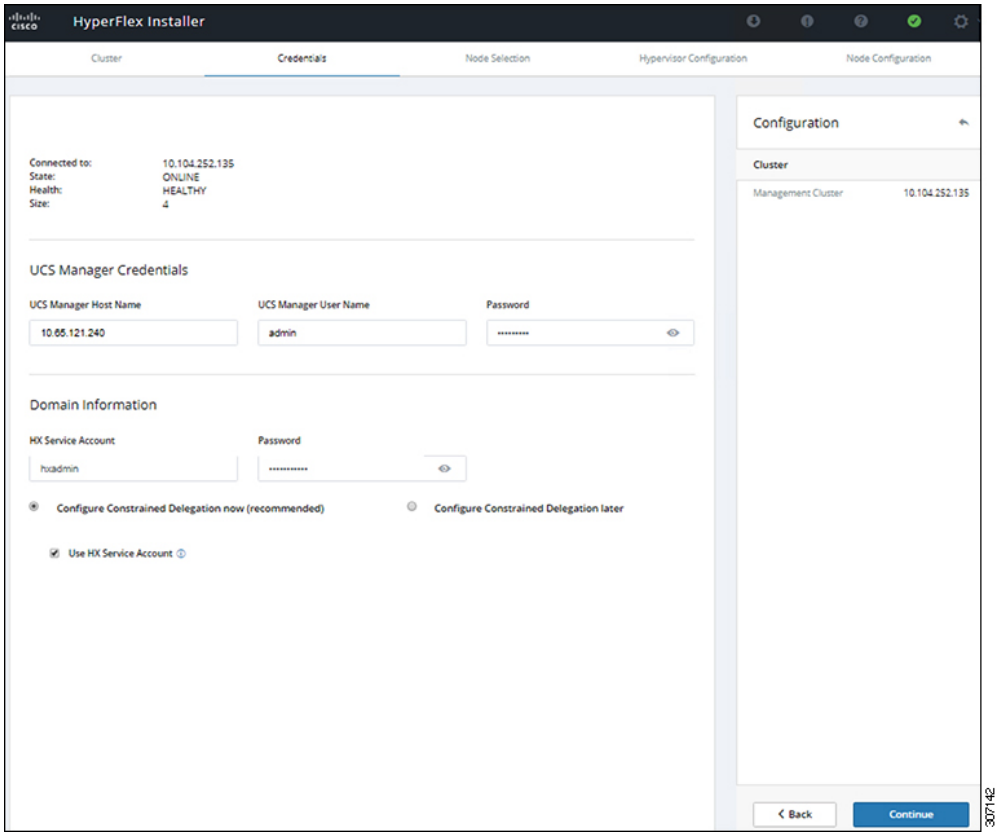
Table 2: UCS Manager Credentials

Field		
UCS Manager Host Name	FQDN or the VIP address of UCSM.	
UCS Manager User Name	Admin user or a user with UCSM admin rights.	
Password	Password for the UCS Manager User Name.	

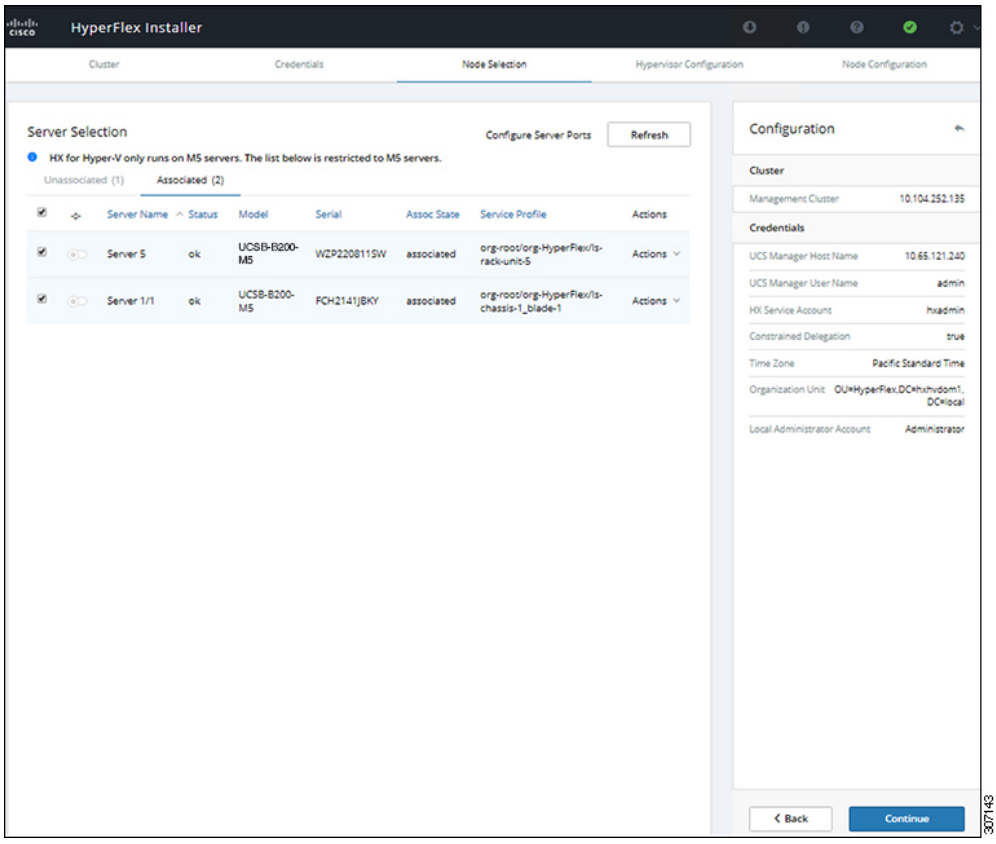
Table 3: Domain Information

Field		
HX Service Account	The HX service account that was created in the preinstallation phase.	hxadmin
Password	Password for the HX service account.	
Configure Constrained Delegation now (recommended) Constrained Delegation later	Select one of the checkboxes. Constrained Delegation is required for VM Live Migration.	

Use the following illustration as a reference for entering values in this screen.



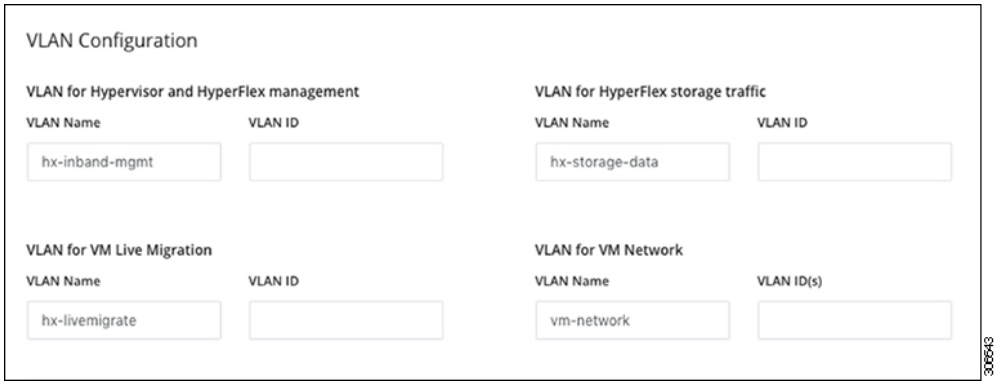
Step 8 In the **Node Selection** page, choose all the servers that you want to install in the cluster and click **Continue.**



Step 9 In the **Hypervisor Configuration** page, complete the following fields for **VLAN Configuration**, **Hypervisor Settings**, and **Hypervisor Credentials**.

VLAN Configuration—HyperFlex needs to have at least 4 VLANs, each needs to be on different IP subnets and extended from the fabric interconnects to the connecting uplink switches, to ensure that traffic can flow from the Primary Fabric Interconnect (Fabric A) to the Subordinate Fabric Interconnect (Fabric B).

Use the following illustration as a reference for entering values in this screen.



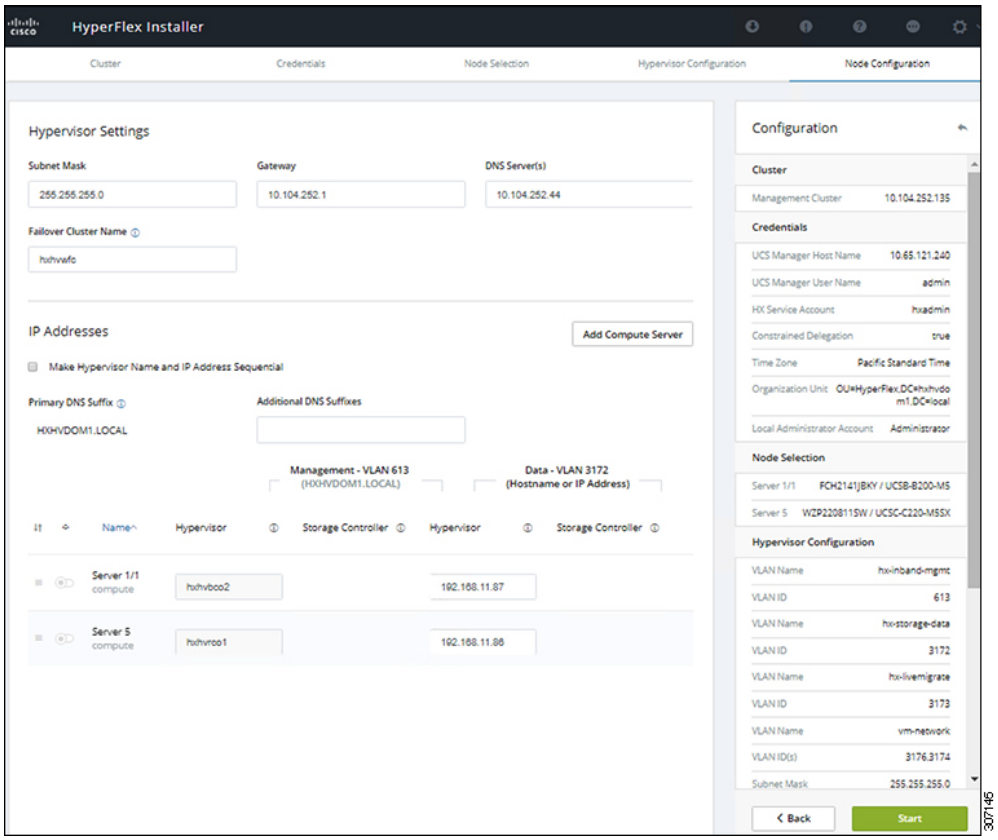
Hypervisor Settings—If you leave the checkbox Make IP Addresses and Hostnames Sequential as checked then the installer will automatically fill the rest of the servers sequential from the first.

Hypervisor Credentials— Enter the Local administrator username on the Hyper-V hosts. Click **Continue**.

Step 10 In the **Node Configuration** page, complete the fields for **Hypervisor Settings** and **IP Addresses**.

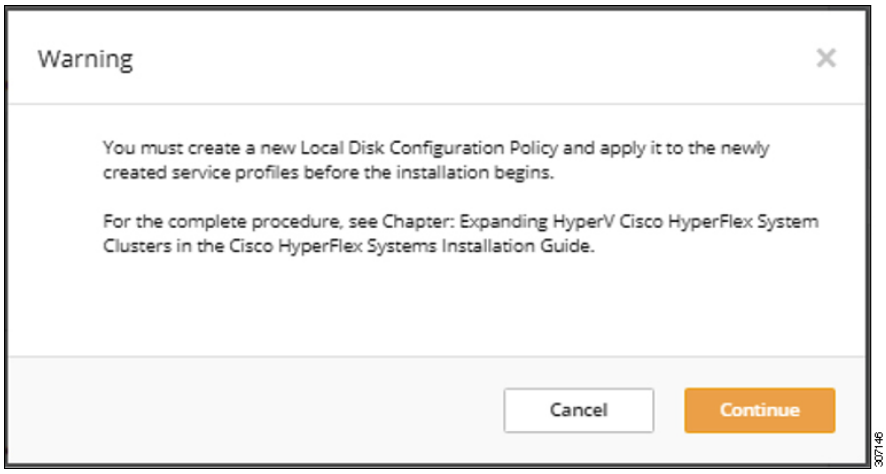
Field	Description	Example Value
Subnet Mask	Subnet mask for the hypervisor hosts management network	255.255.255.0
Gateway	Default gateway for the hypervisor hosts management network	10.101.251.1
DNS Servers	Comma separated list for the DNS Servers in the AD that the hypervisor hosts are going to be member.	10.101.251.1

Use the following illustration as reference for entering values in this screen.

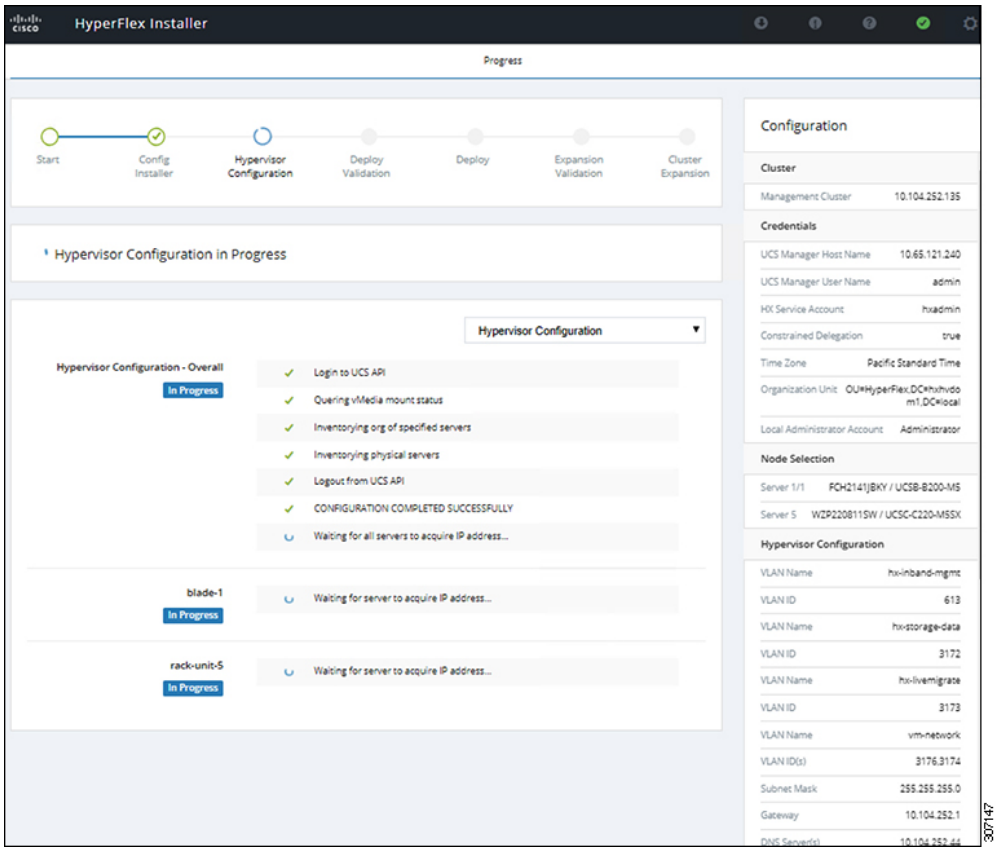


Click **Start** to begin the Hypervisor Configuration. The installation now continues and configures the Hypervisor hosts.

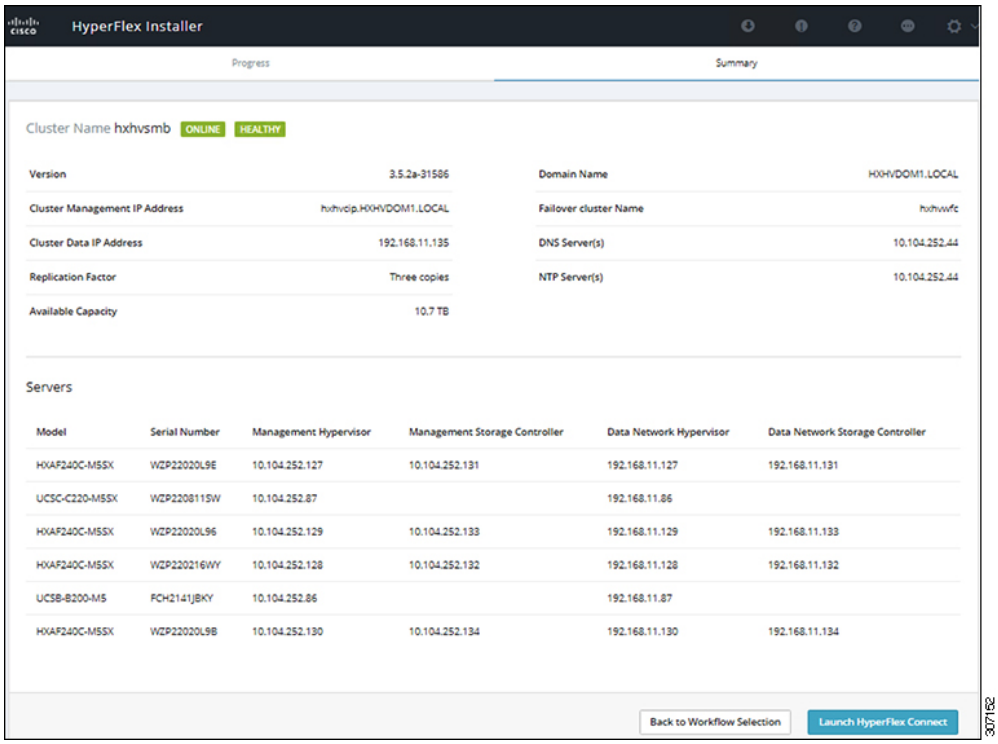
Step 11 In the **Warning** dialog box, click **Confirm and Proceed**.



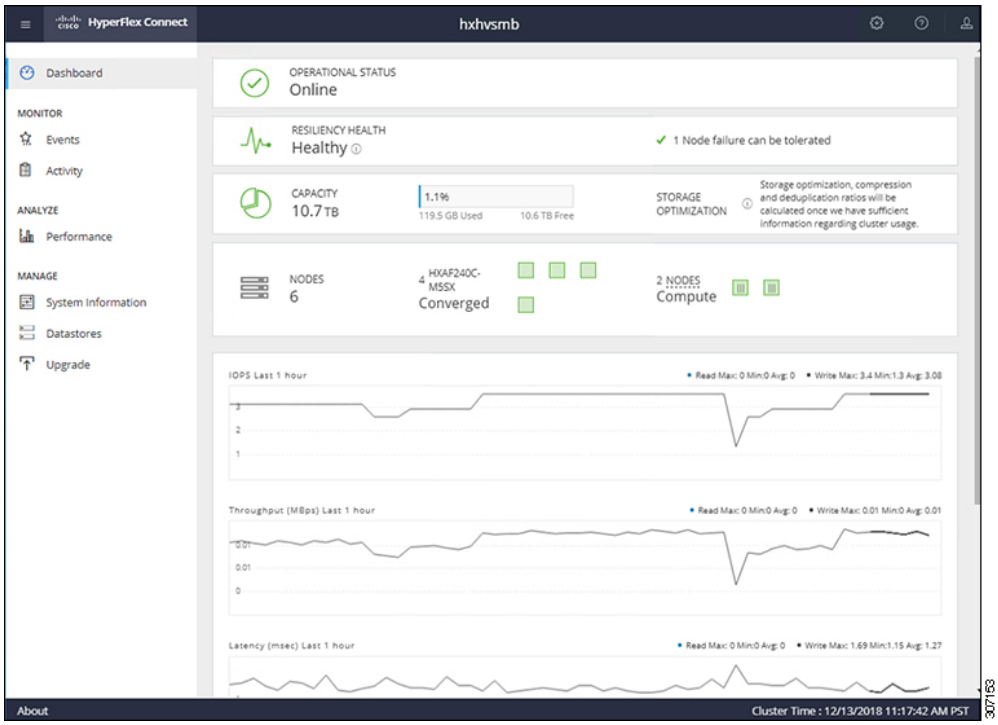
Step 12 The **Progress** screen displays the status of the hypervisor configuration and cluster expansion.



Step 13 When the process finishes successfully, the **Summary** page displays the completion status.



To log into HX Connect, click **Launch HX Connect**. The HX Connect **Dashboard** page displays cluster health, operational status and information for the newly added compute-only nodes in the cluster.



Cluster Expansion - M4 Blade Servers (Fibre Chanel SAN)

Overview

The Hyper-V cluster expansion procedure for **UCS B200 M4 blade servers with Fibre Channel** storage boot option consists of the following sequence of tasks:

1. Pre-expansion Checklist, on page 1
2. Cisco UCS Manager Configuration
3. Microsoft Windows OS Installation, on page 27
4. Hypervisor Configuration, HXDP Software Installation and Cluster Expansion
5. Perform the following post installation steps:
   - Configuring a Static IP Address for Live Migration and VM Network
   - (Optional) Post Installation Constrained Delegation
   - Configure Local Default Paths
   - Checking the Windows Version on the Hyper-V Host

Microsoft Windows OS Installation

This procedure is when you wish to expand your Hyper-V cluster by adding **UCS B200 M4 Blade servers (compute-only nodes)** and enable **Fibre Channel SAN** boot option.

Step 1 Launch UCS Manager and log in.

Step 2 **Perform the following steps to clone a Service Profile template:**

a) In the Navigation pane, click **Servers**.
b) Expand the node for the organization where you want to clone and select **Create a Clone**
c) In the **Create Clone from Service Profile** dialog box, enter a name you to use for the new profile in the **Clone Name** field (Example: **`hx-compute`**. Click **OK**.

Step 3 **Perform the following steps to enable FC Zoning:**

a) In the Navigation pane, go to **SAN** > **VSAN**.
b) Ensure that the **Enabled** radio-button is selected under **FC Zoning**.

Step 4 Unbind your blade server from the current Service Profile template, and bind it to the newly created template in Step 2.

Step 5 Perform the following steps to mount the `HyperFlex Driver Image` file and modify the `autounattend.xml` file:

a) Connect to your HX Installer VM and navigate to the shared folder that contains the Windows ISO and HyperFlex Driver Image files.
b) Run the following commands to mount the HyperFlex image:

```
mkdir /mnt/hx-img
mount /var/www/localhost/images/latest.img /mnt/hx-img
```

c) Open the `autounattend.xml` file, search for DiskID and change the value from 0 to the value in Windows PE (WinPE).

Step 6 Perform the following steps to configure a SAN boot policy:

a) Select the newly created Service Profile Template from Step 2 and go to the **Boot Order** tab. Click **Modify Boot Policy**. In the **Modify Boot Policy** page, click **Create Boot Policy**.

b) Expand vHBAs, select **Add SAN Boot**, and in the name field, type the name of the vHBA(Example: hx-ext-fc-a).

c) Select **Primary** and click **OK**.

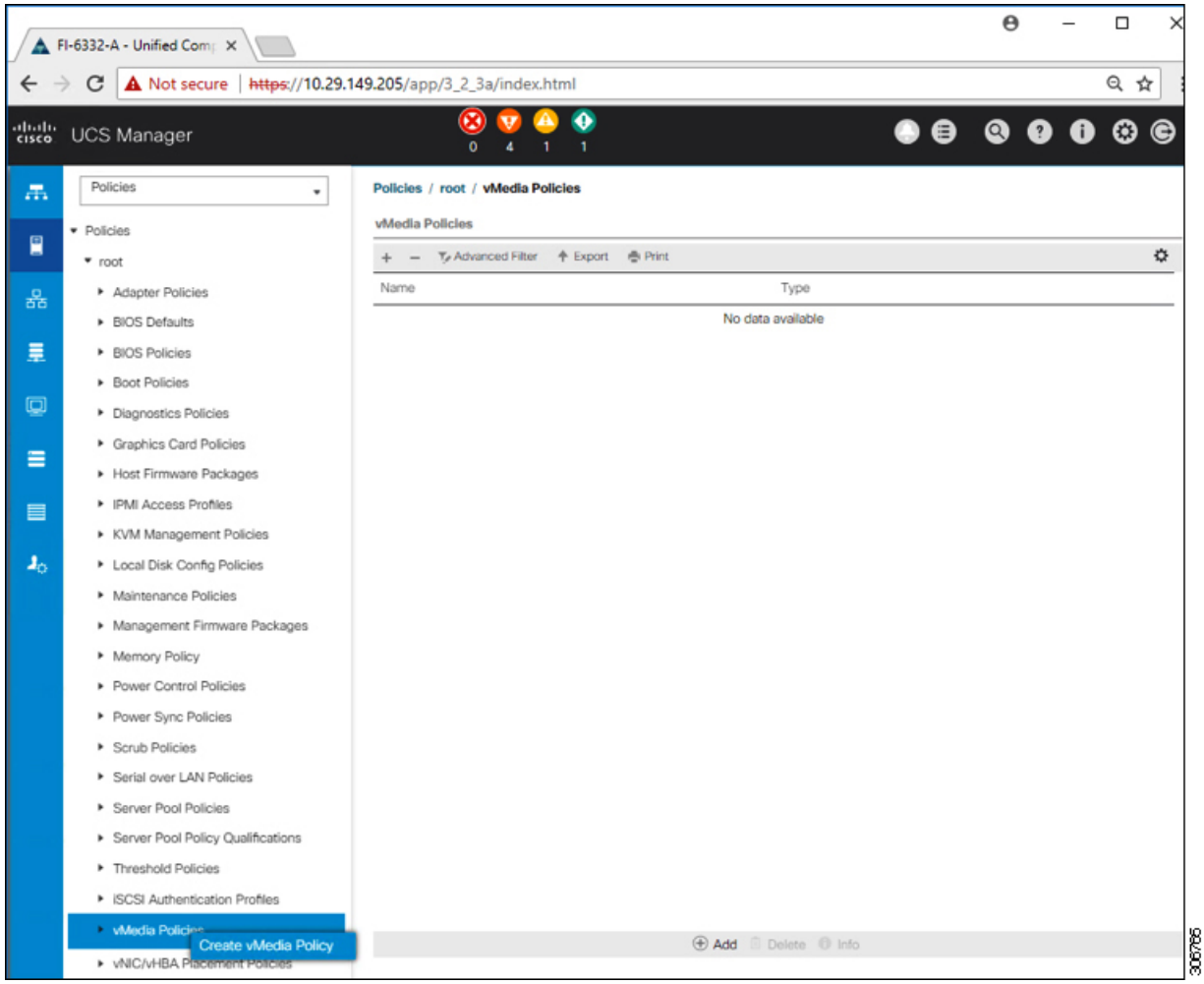
d) In the **Add SAN Boot Target**, leave the **Boot Target LUN** set to **0**. In the **Boot Target WWPN** field, type the WWPN from your storage array. Verify **Type** is set to **Primary** and click **OK**.

Step 7 **Create a vMedia policy for the Windows OS and Cisco driver images:**

a) In the Navigation pane, click **Servers**.

b) Expand **Servers** > **Policies** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **vMedia Policies**

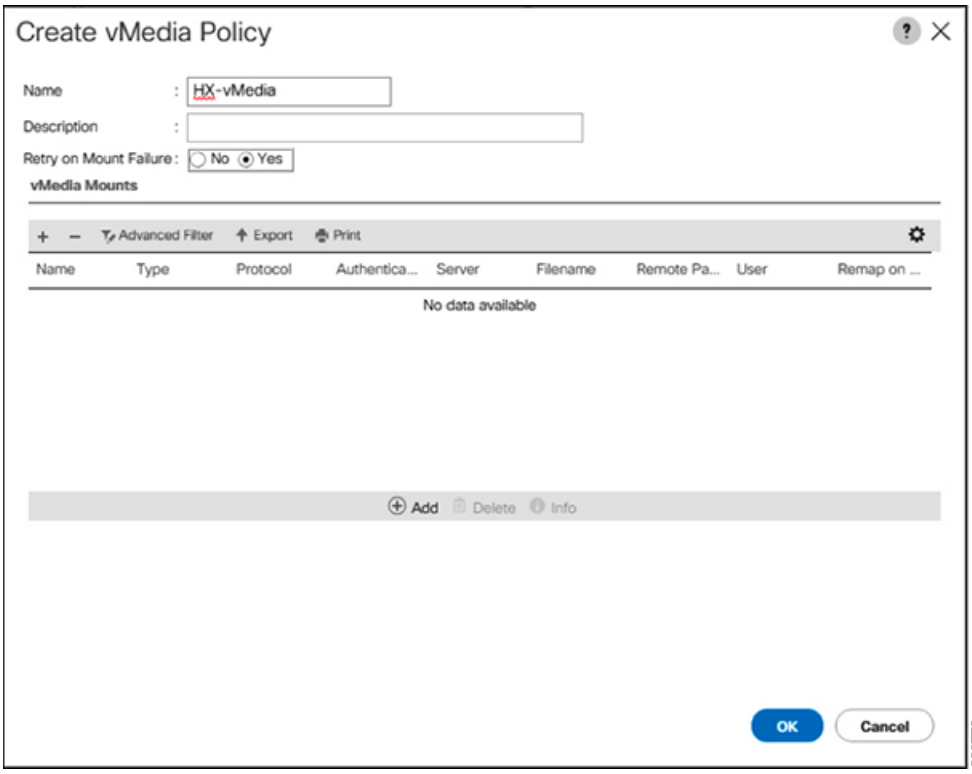
c) Right-click **vMedia Policies** and select **Create vMedia Policy HyperFlex**.



d) In the **Create vMedia Policy** dialog box, complete the following fields:

Field Name	Description
Name	The name of the vMedia policy. For example, *HX-vMedia*. This name can be between 1 and 16 alphanumeric characters. You cannot use spaces or any special characters other than - (hyphen), _ (underscore), : (colon), and . (period), and you cannot change this name after the object is saved.
Description	A description of the policy. We recommend including information about where and when the policy should be used. Maximum 115 characters.
Retry on Mount Failure	Designates if the vMedia will continue mounting when a mount failure occurs. This can be: • **Yes** • **No** **Note** The default setting is **Yes**. When **Yes** is selected the remote server will continue to try to mount the vMedia mount process until it is successful or you disable this option. If you select No, a warning message will appear indicating retry on mount failure will not work in case of mount failure.

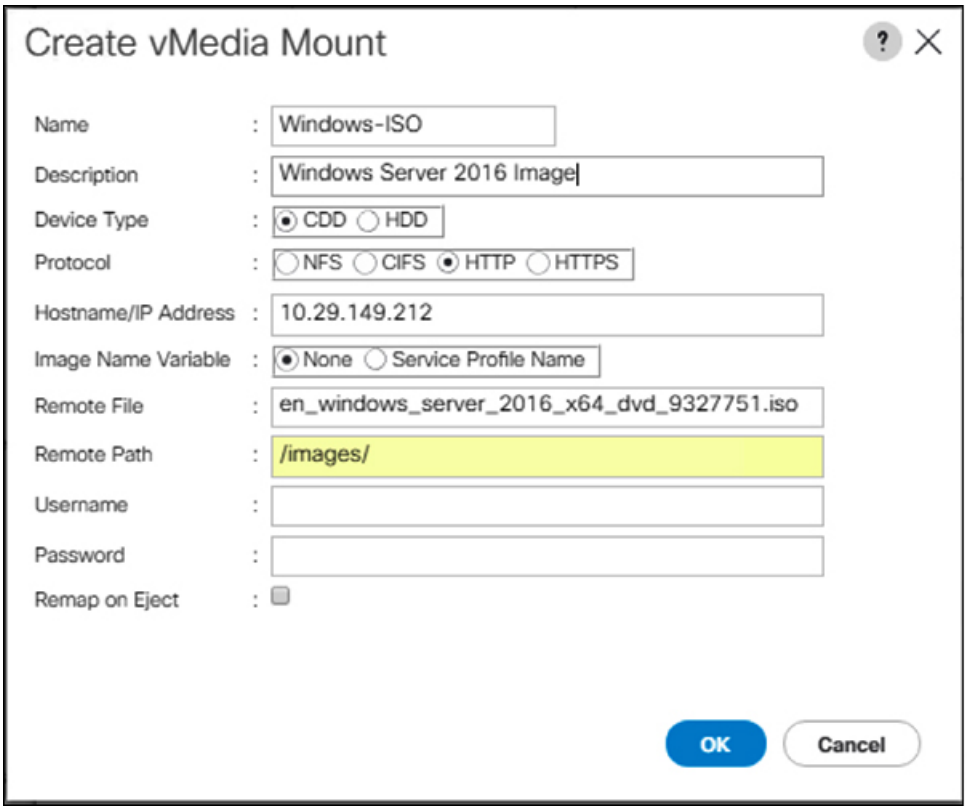
Refer to the following screenshot as an example:



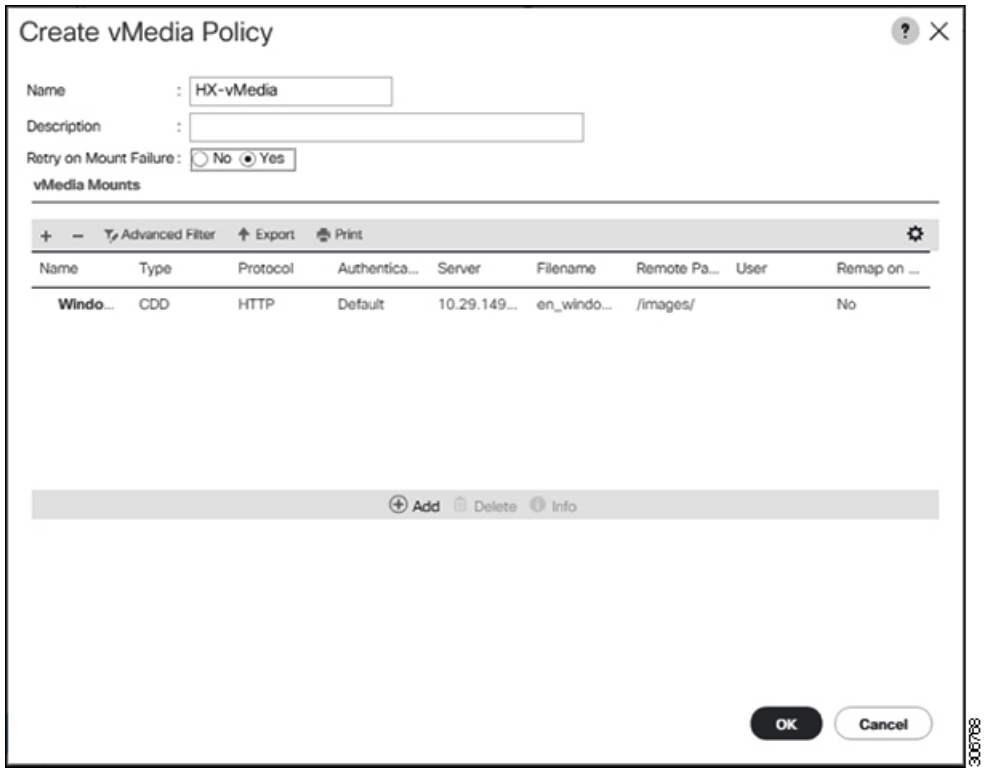
e) On the icon bar under the **vMedia Mounts** pane, click **+ Add**. In the **Create vMedia Mount** dialog box, complete the following fields:

Field Name	Description	Example Value
Name	Name for the mount point.	Windows-ISO
Description	Can be used for more information.	Windows Server 2016 image
Device Type	Type of image that you want to mount. This can be: • **CDD**—Scriptable vMedia CD. • **HDD**—Scriptable vMedia HDD.	CDD
Protocol	The protocol used for accessing the share where the ISO files are located.	HTTP
Hostname/IP Address	IP address or FQDN of the server hosting the images.	10.101.1.92
Image Name Variable	This value is not used in HyperFlex installation.	None
Remote File	The filename of the ISO file that you want to mount.	
Remote Path	The path on the remote server to where the file resides	
Username	If you use CIFS or NFS a username might be necessary	
Password	If you use CIFS or NFS a password might be necessary	

Refer to the screenshot below as an example:

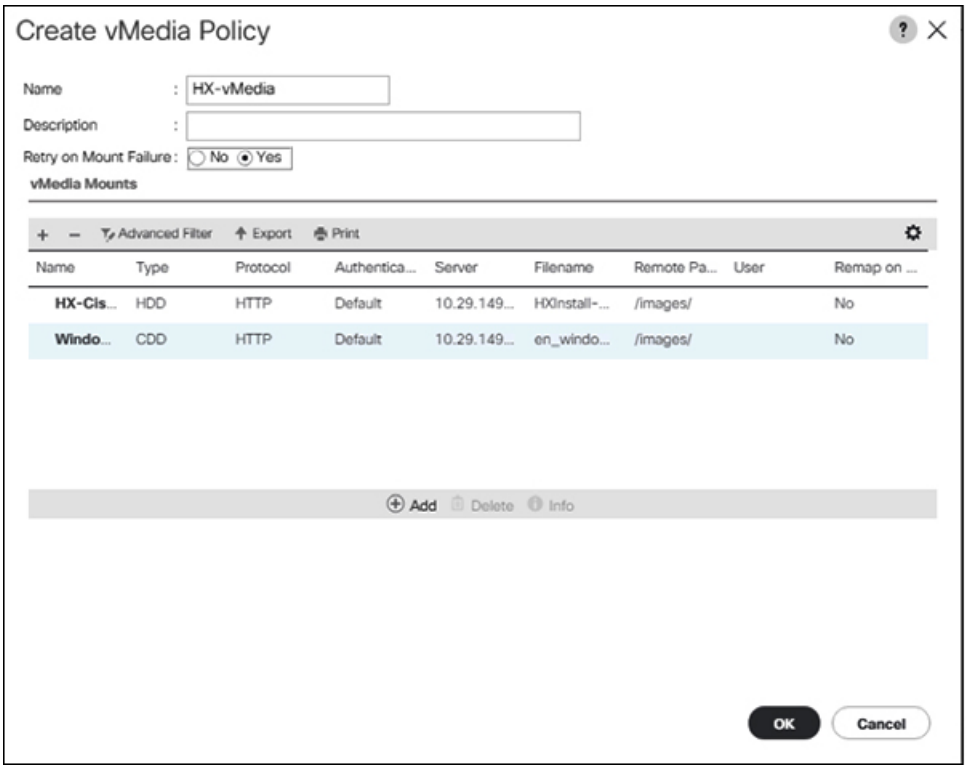


f) Click **OK**. When you click **OK**, you will now be returned to the **vMedia Policies** screen, and you should see the information that you just submitted.



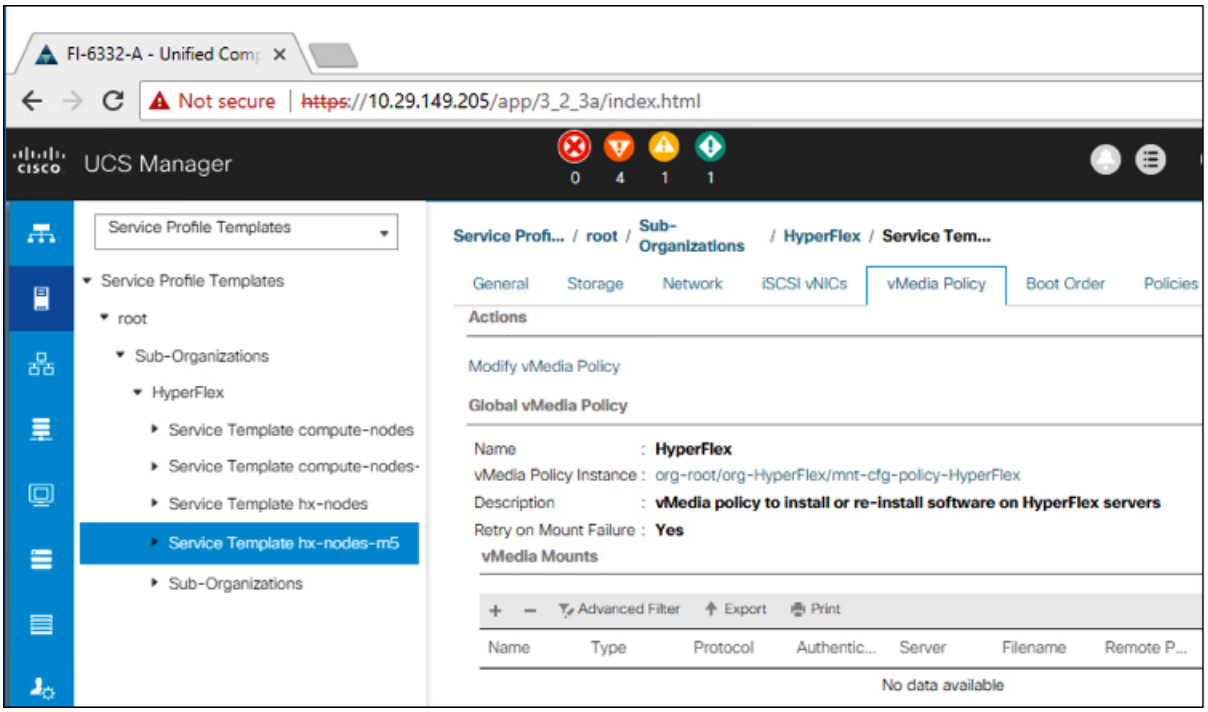
g) Repeat **Steps 2e and 2f**, however, change the type to **HDD** and the remote file name to the **Cisco HyperFlex driver image**.

h) At the end of this step, the two vMedia mounts will be listed in the Create vMedia Policy screen as shown in the following screenshot:



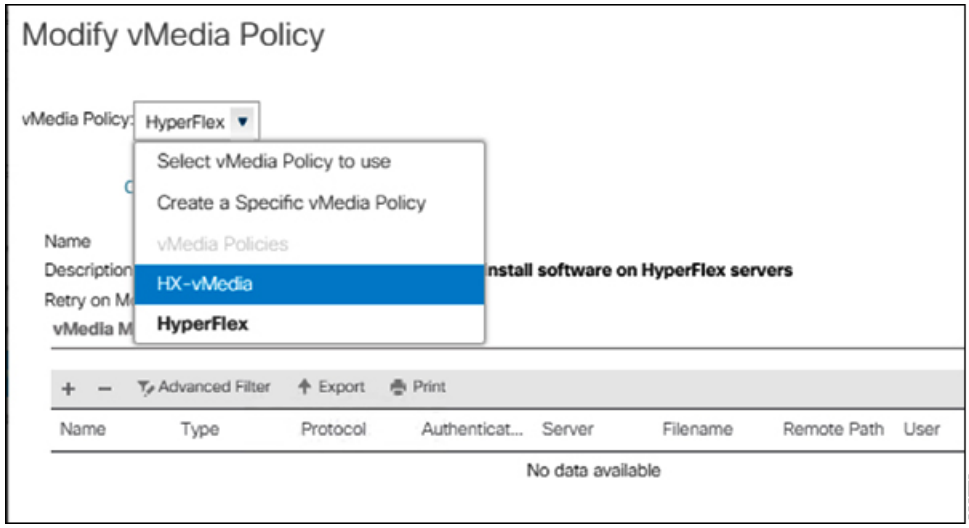
Step 8 **Associate the vMedia Policy to a Service Profile**:

a) In the Navigation pane, select **Servers** > **Service Profile Templates** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **Service Template *compute-nodes, or compute-nodes-m5***

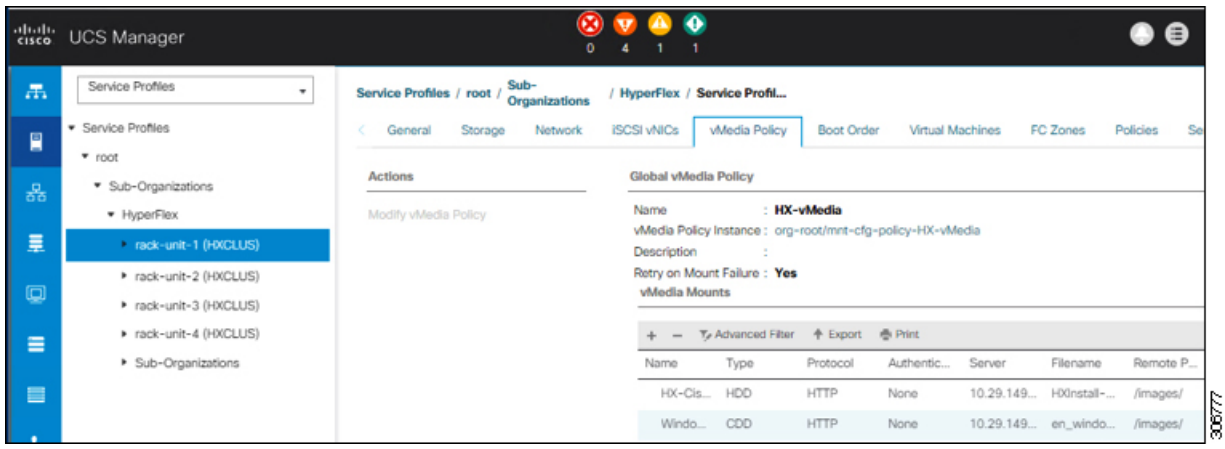


b) Click the **vMedia Policy** tab. Then, click **Modify vMedia Policy**

c) Choose the **vMedia Policy** that you created earlier from the drop-down selection, and click **OK** twice.



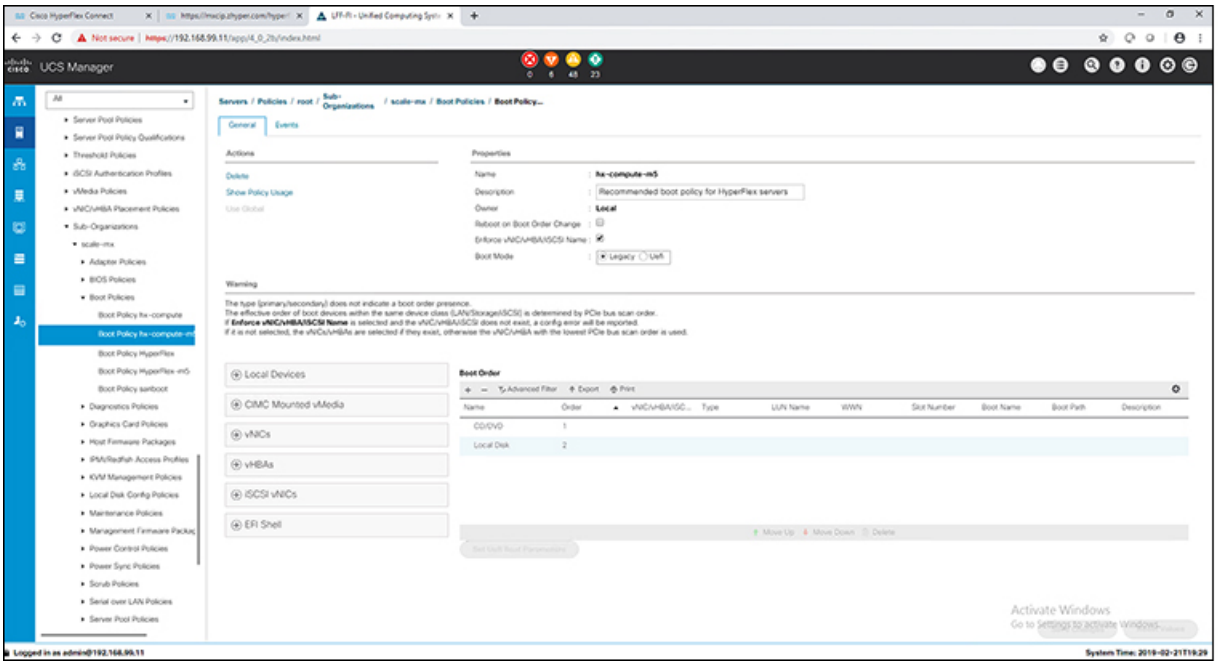
d) Under the **General** tab, verify that the vMedia policy is added to the Service Profile.



Step 9 **Modify Boot Policy and set the boot order to have CIMC CD/DVD to the list:**

a) In the Navigation pane, click the **Servers** tab.

b) Expand **Servers** > **Policies** > **root** > > **Boot Policies** > ***hx-compute, or hx-compute-m5***



c) **(For M5 Servers only)** In the **Boot Order** configuration pane, click **CIMC Mounted CD/DVD** . Then, click **Add CIMC Mounted CD/DVD** to add this to the boot order. Move it to the top of the boot order using the **Move up** button.

Important The **CIMC Mounted CD/DVD** option must be highest in the boot order preceding the other options, **Embedded Local Disk** and **CD/DVD**.

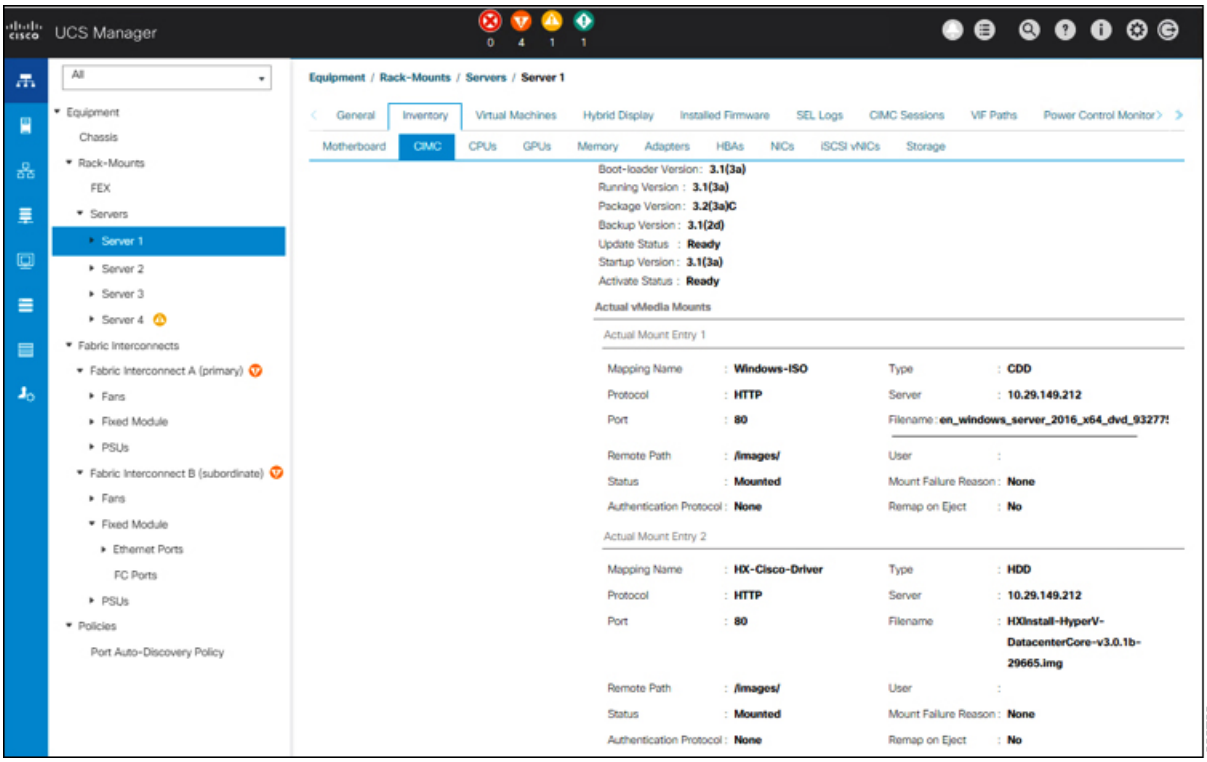
(For M4 Servers with Local SAS Drivers) In the **Boot Order** configuration pane, click **vHBAs**. Then, click **Add SAN Boot** to add this to the boot order.

d) Click **Save Changes**, and click **OK** in the **Success** dialog box. The modified boot policy is saved.

Step 10 **Verify successful vMedia mounting:**

a) On the **Equipment** tab, select one of the servers.

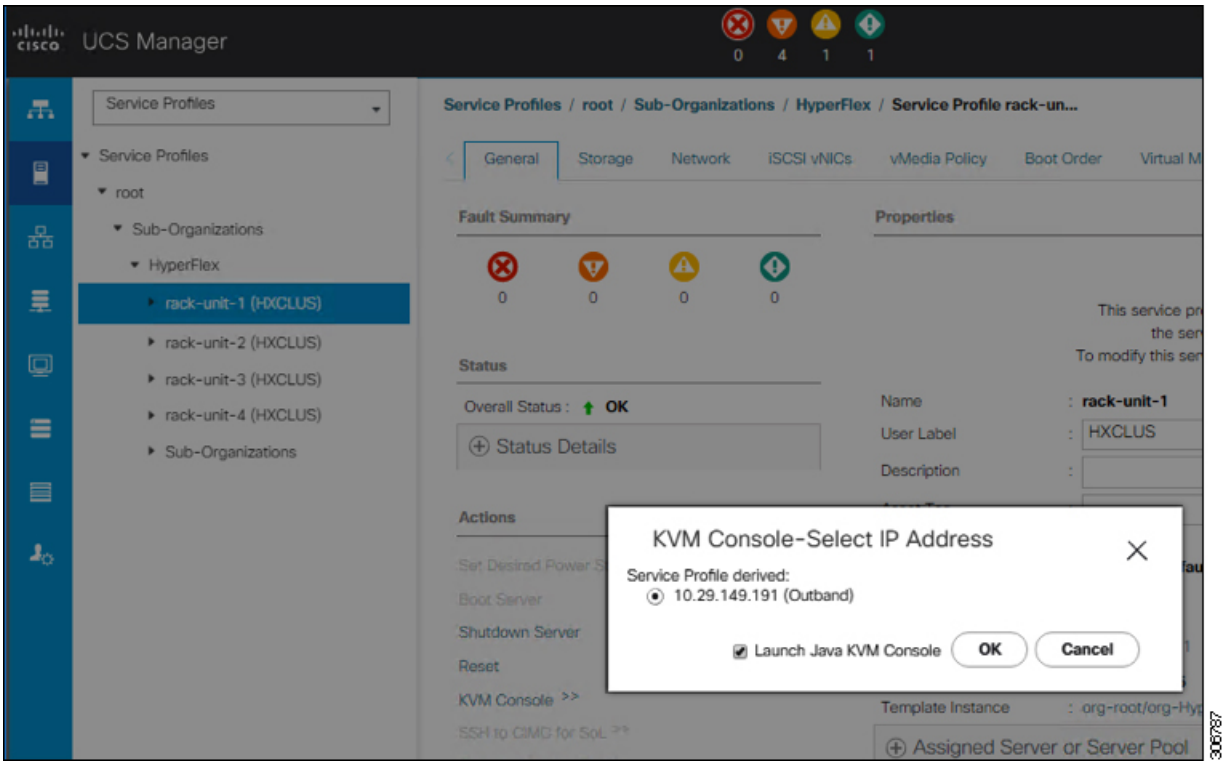
b) Click **Inventory** > **CIMC**, scroll down and ensure for mount entry #1(OS image) and mount entry #2 (Cisco HyperFlex driver image) you see status as **Mounted** and there are no failures.



c) In the menu bar, click **Servers** and choose the first HyperFlex service profile.

d) Click the **General tab** and choose **Actions** > **KVM Console>>**.

Note The KVM console will try to open in a new browser. Be aware of any pop-up blockers. Allow the pop-ups and re-open the KVM



e) Reboot the host, launch the KVM Console, and power on the server to monitor the progress of the Windows installation. You should see the **Loading Files** screen appear. Windows should install automatically without user intervention. You should see a blue screen and within a few moments you should see the **Setup is starting** message. If automated installation does not begin, double-check that both images are mounted to the server.

f) Once Windows installation completes, a command prompt will show up. Wait for the installation to complete. The host will then reboot a few times. The installation is complete when you get a clear command prompt at `c:\users\administrator>`. It may take several minutes and reboot operations for the Driver Image to be copied and installed.

Note Ignore the prompt with the **The system cannot find the file specified** message.

Important Ensure that you have completed **Steps e and f,** on ALL servers that will be part of the HX cluster.

g) Log into each server, enter the command `C>Users>Administrator>Get-ScheduledTask` and verify that the HX Install Bootstrap Launcher task is running.

Step 11 **Remove the vMedia policy from the service profile:**

a) To un-map the vMedia policy from the service profile, go to **Servers** > **Service Profile Templates** > **root** > **Sub-Organizations** > ***hx-cluster_name*** > **Service Template** ***compute-nodes, or compute-nodes-m5***. Then, click on **Modify vMedia Policy**.

b) Under the vMedia Policy drop-down selection, deselect the vMedia policy (*HX-vMedia*) previously used to map the two images.

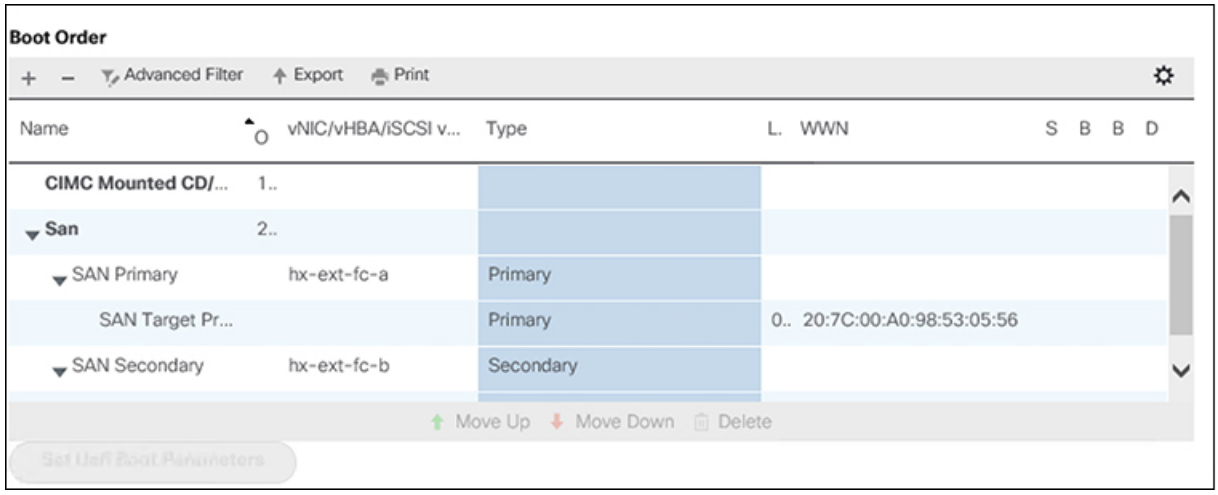
Step 12 **Restore the boot order to the one before installation:**

a) In the Navigation pane, click the **Servers** tab.

b) Expand **Servers** > **Policies** > **root** > > **Boot Policies** > ***hx-compute, or hx-compute-m5***

c) In the **Boot Order** configuration pane, use the **Move Down** button to move **CIMC Mounted CD/DVD** option to the bottom of the list.

Refer to the screenshot below for the boot order after it is restored in this step:



What to do next

At the end of this procedure, Windows OS is successfully installed. Then, continue to "Hypervisor Configuration, HXDP Software Installation and Cluster Expansion" to complete the remaining steps in the cluster expansion workflow.