



White Paper

# SimpliVity OmniStack with Cisco UCS Manager Integration

## Cisco UCS C240 M4SX Platform with Cisco UCS Manager Integration

This document describes how to connect a Cisco UCS® C240 M4SX Rack Server, a Cisco UCS C-Series Rack Server delivered as SimpliVity OmniStack infrastructure, to an existing or new environment managed by Cisco UCS Manager.

The Cisco UCS C240 M4 Rack Server is an enterprise-class server in a 2-rack-unit (2RU) form factor. It uses Intel® Xeon® processor E5-2600 CPUs. It provides 24 DIMM slots, supports up to 24 front-loading small form-factor drives, and includes two 1 Gigabit Ethernet LAN-on-motherboard (LOM) ports.

The Cisco UCS C240 M4SX model adds the following hardware:

- SimpliVity OmniStack accelerator card
- 2-port 10 Gigabit Ethernet modular LOM (mLOM) Cisco® virtual interface card
- 2 64-GB Cisco FlexFlash Secure Digital (SD) cards for VMware ESXi boot
- 1 480GB 2.5 inch Enterprise Value 6G SATA SSD for SimpliVity OVC datastore

Figure 1 shows the Cisco C240 M4SX. Figure 2 shows the setup for a Cisco UCS Manager environment.

**Figure 1.** Cisco UCS C240 M4SX Platform Configured for Deployment as a SimpliVity Federation OmniStack



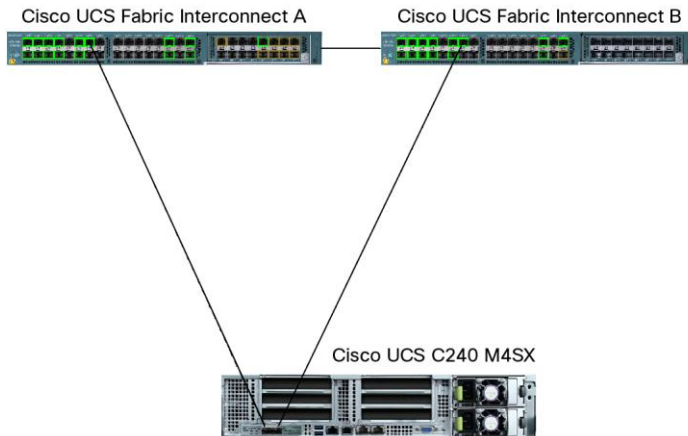
Integration of the C240 M4SX offers multiple connection topologies:

- Single-wire connection directly to the Cisco UCS fabric interconnect
- Single-wire connection to a Cisco UCS fabric extender (FEX) uplinked to the fabric interconnect
- Dual-wire connection to a Cisco UCS fabric extender uplinked to the fabric interconnect

The default preference is to connect the rack server using single-wire management. A fabric extender can be used instead of direct connection to the fabric interconnect for scaling purposes, because the fabric extender allows additional servers to connect while saving ports on the fabric interconnect.

Performance factors must be considered when aggregating multiple Cisco UCS nodes for OmniStack through a single fabric extender to help ensure that there is adequate bandwidth to support the anticipated workload.

**Figure 2.** Cisco UCS C240 M4SX Platform Configured for Deployment for Cisco UCS Manager Environment



### Cisco UCS C240 M4SX Integration Process Overview

Table 1 summarizes the main steps for deploying a Cisco UCS C240 M4SX server for integration into a Cisco UCS Manager environment.

- Cisco UCS Manager Firmware Release 2.2(4b) or later is required.
- The server will be preconfigured with the PCI Express (PCIe) slots populated in the following order (the hardware for these slots will be delivered by SimpliVity):
  - Slot 1: Must remain empty for I/O card to fit properly
  - Slot 2: SimpliVity I/O accelerator field-programmable gate array (FPGA) card
  - Slot 3: No slot available, occupied by two connectors for SATA Boot drives for SimpliVity OVC datastore installation
  - Slot 4 to 6: Open slots
  - mLOM: Cisco UCS VIC 1227
  - Modular RAID: Cisco 12-Gbps RAID controller

```
PCIe Slots Inventory
-----
SlotID:2      Unknown Vendor Unknown Device
SlotID:MLOM  UCS VIC 1227 10Gbps 2 port CNA
SFP+
SlotID:HBA   Cisco 12G SAS Modular Raid
Controller
```

- The following components are required for the Cisco C240SX single-wire connection to an optional Cisco UCS fabric extender to connect to the fabric interconnects:
  - Two 32-port fabric extender modules uplinked to a Cisco UCS fabric interconnect (Nexus 2232PP)
  - Four 10-Gbps Enhanced Small Form-Factor Pluggable (SFP+) direct-attached cable or eight SFP+ modules for connection between the rack server and the fabric extender

**Table 1.** Configuration Process Overview

Step	Substep	Action	Notes
1	0	Receive the servers from SimpliVity.	
	1	Reset the Cisco Integrated Management Controller (IMC).	Reset Cisco IMC from standalone mode to Cisco UCS Manager integrated mode. Please refer to "Cisco UCS C-Series Server Integration with Cisco UCS Manager 2.2" or above on Cisco.com
2	0	Connect the server to the Cisco UCS managed domain.	This step assumes that all prerequisites are met.
	1	Connect the Cisco UCS VIC 1227 ports to the fabric extender or fabric interconnect.	Port 1 connects to fabric interconnect A, and port 2 connects to fabric interconnect B.
	2	Enable the server ports on the fabric interconnect.	Configure the C240 M4SX for a connection to a fabric extender or for direct connection to the fabric interconnect.
	3	Power on and discover the server in Cisco UCS Manager.	This is an automated process
3	0	Set up a Cisco UCS server profile template for SimpliVity.	This is the template used for SimpliVity nodes. (Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)
	1	Configure the BIOS policy.	Configure the required SimpliVity BIOS settings. (Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)
	2	Configure the firmware policy.	This policy is determined by SimpliVity. (Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)
	3	Configure a local disk configuration policy.	This policy protects the initial configured disks from erasure.
	4	Configure the boot policy.	This policy sets the local boot configuration. (Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)
	5	Configure the virtual network interface card (vNIC) network template.	SimpliVity recommended network configuration for appliance nodes.
	6	Create a service profile template.	(Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)
7	Assign the service profile to a host and boot.	(Refer to SimpliVity OmniStack_UCS_C240_M4X_Installation and_Maintenance_Guide_760_00012_RevA.pdf)	

## Parts and Tools Required

Table 2 lists the parts and tools required for the integration process.

**Table 2.** Parts and Tools Required

Part Description	Notes	Model or Description
<b>Server</b>	Minimum of 2 servers for cluster nodes	Cisco UCS C240 M4 Rack Server (UCSC-C240-M4SX)
<b>Fabric interconnect</b>	Already present in the environment	2 Cisco 6200 Series Fabric Interconnects
<b>Fabric extender</b>	If not present, can optionally be added to the configuration	2 Cisco Nexus® 2232PP 10GE Fabric Extenders (optional)
<b>Cables and modules</b>		Two 10-Gbps direct-attached cables OR four 10-Gbps SFP+ modules per server and 2 LC optical OM3 cables
<b>10 Gigabit Ethernet NIC</b>		Cisco UCS VIC 1227 dual-port 10-GB SFP+

## Receive the Server Nodes

1. Carefully unpack the server.
2. Install the server in the rack and attach the power cables.

## Reset Cisco IMC for Cisco UCS Manager Integrated Mode

Reset the IMC to the factory default mode after it arrives from SimpliVity because SimpliVity will have configured the server in standalone mode. For Cisco UCS Manager to correctly identify the rack server, the IMC module must be set to the Cisco UCS Manager mode.

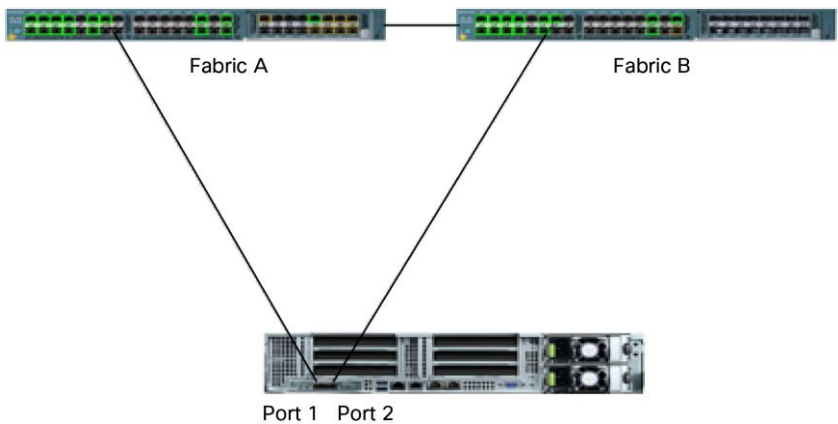
1. Connect to the server using the IMC remote console or direct keyboard, video, and mouse (KVM) access.
2. Turn on the server and press F8 on the POST options screen.
3. Select the option for factory default reset.
4. Power off the server.

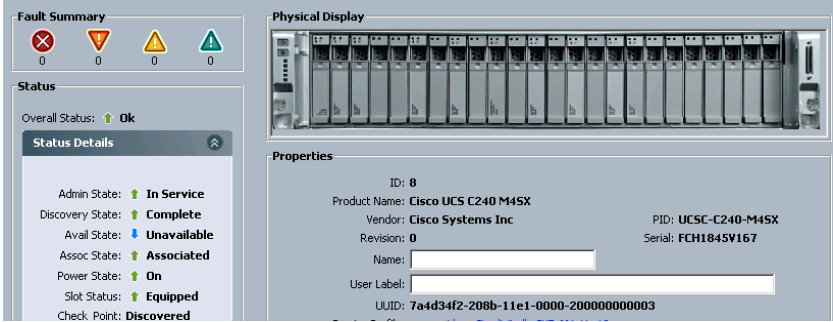
## Connect the Server to the Cisco UCS Managed Domain

Install the Cisco C240 M4SX server in a Cisco UCS managed domain as outlined in the steps in Table 3 for a direct-connect implementation.

These steps assume that if a fabric extender will be used, it is already configured and connected to the fabric interconnect and that uplinks are configured as server ports on the fabric interconnect.

**Table 3.** Integrating Cisco UCS C-Series Single-Wire Mode Direct Connection

Step	Procedure	Image
1	Using a minimum of 2 servers for cluster nodes with server powered off, connect the 10-Gbps VIC ports to the fabric interconnects. Connect left port 1 to fabric A. Connect right port 2 to fabric B.	
2	Configure the fabric interconnect ports as server ports.	

<p><b>3</b></p> <p>Power on the server. Let the system be discovered and become visible in Cisco UCS Manager.</p> <p><b>Note:</b> This process will take several minutes to complete.</p>		 <p>The screenshot displays the Cisco UCS Manager interface for a server. It includes a 'Fault Summary' section with four icons (red X, yellow triangle, yellow triangle, green triangle) and a 'Status' section showing 'Overall Status: Ok'. The 'Status Details' section lists: Admin State: In Service, Discovery State: Complete, Avail State: Unavailable, Assoc State: Associated, Power State: On, Slot Status: Equipped, and Check Point: Discovered. The 'Physical Display' section shows a rack of server blades. The 'Properties' section includes: ID: 8, Product Name: Cisco UCS C240 M45X, Vendor: Cisco Systems Inc, PID: UCSC-C240-M45X, Revision: 0, Name: (empty field), User Label: (empty field), and UUID: 7a4d34f2-208b-11e1-0000-200000000003.</p>
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## Set Up a Cisco UCS Server Profile Template for SimpliVity

### Configure the BIOS Policy

Configure the BIOS policy with the following settings defined for SimpliVity nodes. (Other settings can be defined in the policy as required by the end user.) The following instructions are for Cisco UCS Manager Firmware Release 2.2(4) and later. Previous to this release, several of these policies are not visible and must be set locally on the host server in the system setup (press F2).

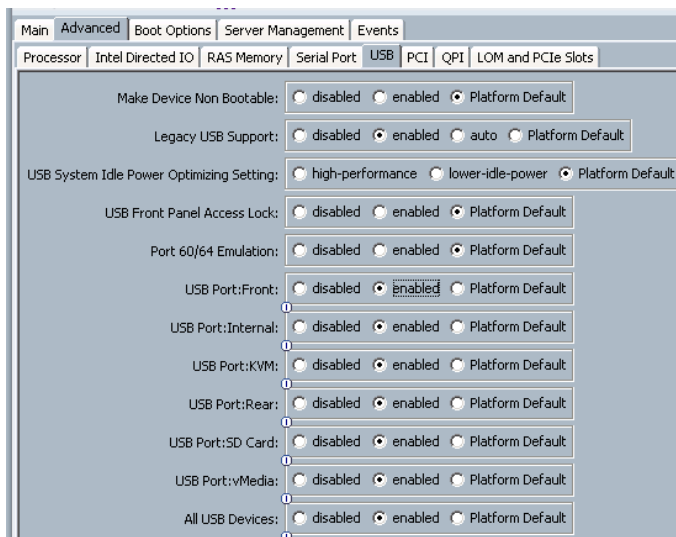
1. Select BIOS Policy and create a new policy.
2. Choose Advanced > Processor.
  - a. For Power Technology, choose performance.
  - b. For Energy Performance, choose performance.



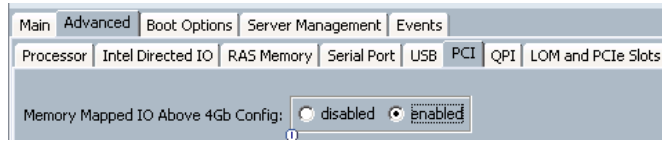
3. Choose Advanced > LOM and PCIe Slots.
  - a. Set all onboard LOM ports to enabled.
  - b. Set all LOM port OptionROM settings to enabled.
  - c. Set all PCIe slot link speed settings to gen3.



4. Choose Advanced > USB and enable all USB ports and devices.



5. Choose Advanced > PCI and enable Memory Mapped IO Above 4Gb Config.



6. Choose Advanced > Server Management and enable FRB-2 Timer.



The PCIe slot configuration from the view of local system BIOS on the Cisco C240 M4SX server should look like this: The following view shows the PCIe device population:

```
PCIe Slots Inventory
SlotID:2      Unknown Vendor Unknown Device
SlotID:MLDM  UCS VIC 1227 10Gbps 2 port CNA
SFP+
SlotID:HBA   Cisco 12G SAS Modular Raid
Controller
```

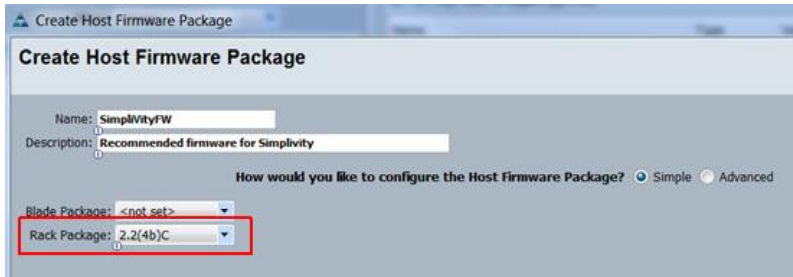


## Configure the Firmware Policy

Configure the firmware package policy for nodes based on the Cisco UCS C240 M4SX firmware release by SimpliVity.

1. Choose Policies > Create Host Firmware Package.
2. Select the rack package from the list of uploaded firmware on the fabric interconnect.

The firmware package should be 2.2(4b)C



The screenshot shows the 'Create Host Firmware Package' configuration page. The 'Name' field is 'SimpliVityFW' and the 'Description' is 'Recommended firmware for SimpliVity'. The 'How would you like to configure the Host Firmware Package?' section has 'Simple' selected. The 'Blade Package' is '<not set>' and the 'Rack Package' is '2.2(4b)C', which is highlighted with a red box.

## Configure a Local Disk Policy

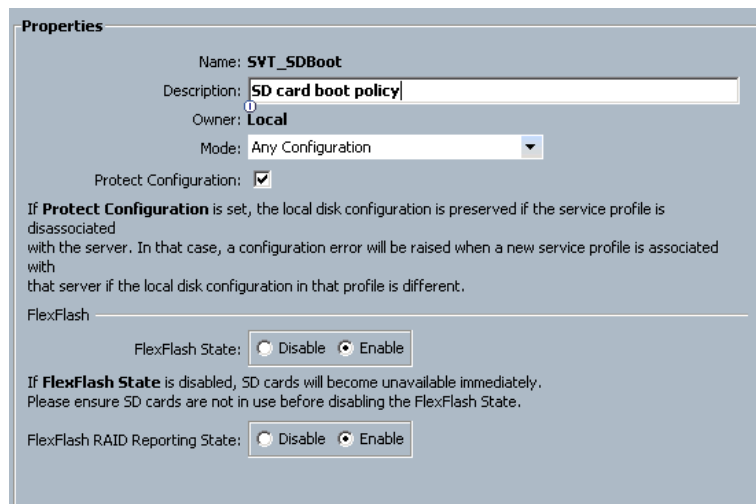
To protect the SimpliVity configured disks and RAID array, create a local disk configuration policy. With this policy, when a service profile is removed from the host server, the RAID and disk configuration remain intact and protected against erasure.

Choosing Any Configuration carries forward the local disk configuration without any changes; Cisco UCS Manager will ignore all RAID controller configuration settings.

**Warning:** Do **not** select NO RAID. Doing so will set the RAID controller back to JBOD when the profile is moved or a deep inspection is performed, **destroying all data on the disks.**

Selecting Protect Configuration retains the local disk configuration policy even if the service profile is disassociated.

1. Select Local Disk Config Policies.
2. Create a new policy.
  - a. For Mode, choose Any Configuration.
  - b. Select the Protect Configuration option.



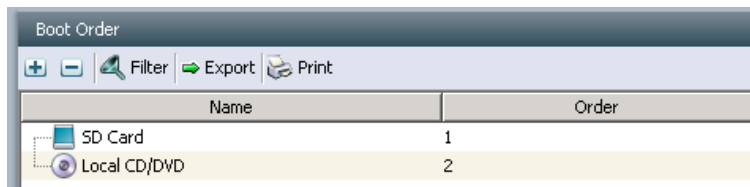
The screenshot shows the 'Properties' configuration page for a local disk policy. The 'Name' is 'SVT\_SDBoot' and the 'Description' is 'SD card boot policy'. The 'Owner' is 'Local' and the 'Mode' is 'Any Configuration'. The 'Protect Configuration' checkbox is checked. Below this, there is a warning: 'If Protect Configuration is set, the local disk configuration is preserved if the service profile is disassociated with the server. In that case, a configuration error will be raised when a new service profile is associated with that server if the local disk configuration in that profile is different.' The 'FlexFlash State' is set to 'Enable' and the 'FlexFlash RAID Reporting State' is also set to 'Enable'.

3. Enable both FlexFlash State and FlexFlash RAID Reporting State to help ensure that the server will boot to the hypervisor partition on the SD cards, which is where the ESXi hypervisor is preinstalled.

### Configure the Boot Policy

Configure a Cisco UCS boot policy with the settings shown here for the local boot configuration. The boot device is logically defined in Cisco UCS Manager integrated mode and uses mirrored Cisco FlexFlash SD cards. You must use 64-GB SD cards for OmniStack nodes.

1. Configure the boot order with local resources only: no Small Computer System Interface over IP (iSCSI), Fibre Channel, local disk, or USB booting devices. SimpliVity uses the Cisco FlexFlash SD only for OS booting.
2. SimpliVity recommends that you disable NIC (preboot execution environment [PXE]) booting. To do this, do not include the NIC interfaces in the boot order configuration.



### Configure the vNIC Network Template

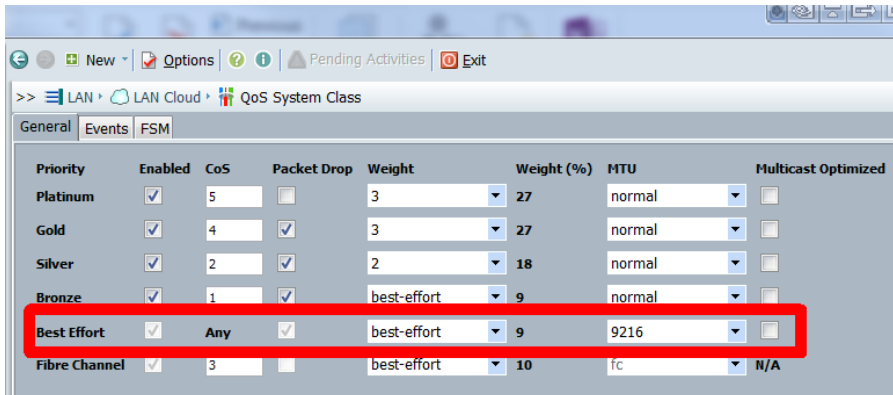
This section covers the recommended vNIC template configuration for SimpliVity OmniCube cluster nodes. In the final server configuration, four 10-Gbps vNIC ports will be presented to the ESXi host for all node communication.

Prior to the SimpliVity software deployment the network configuration must use 2 vSwitches with management on vSwitch 0 and Storage and Federation on vSwitch 1 to have a successful deployment. Post deployment changes are supported by SimpliVity (1 vswitch, vDS etc.)

Cisco encourages the use of vNIC templates and the creation of a SimpliVity connectivity policy. Then assign this newly created template and policy to the service profile template. The steps in Table 4 summarize the high-level end results of the configuration. This document does not cover all the steps for creating the vNIC template or the connectivity policy. Instructions and examples of how to setup vNIC templates and LAN connectivity policies can be found in the Cisco UCS Manager GUI Configuration Guide at Cisco.com

<http://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-manager/products-installation-and-configuration-guides-list.html>

**Note:** SimpliVity requires that vNIC Template for vNIC\_SVT\_Storage\_A and vNIC\_SVT\_Storage\_B must be capable of transmitting Ethernet Package with MTU size 9000 or greater for communication of Storage and Federation of SimpliVity OmniStack. This capability is provided through the Global QoS setup and associated with the vNIC\_Storage\_A and vNIC\_Storage\_B. (Please refer to “Cisco UCS Manager GUI Configuration Guide for detail configuration steps)



**Table 4.** Configuring the vNIC Template

Step	Procedure	Image																									
1	<p>Create the ESX host and virtual machine communication vNICs.</p> <p>Configure 2 vNICs: on Fabric A and Fabric B. Do not configure fabric failover; ESXi NIC teaming will be used.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>MAC Address</th> <th>Desired Order</th> <th>Actual Order</th> <th>Fabric ID</th> </tr> </thead> <tbody> <tr> <td>vNIC SVT_Mgmt_A</td> <td>00:25:B5:00:A1:0C</td> <td>8</td> <td>1</td> <td>A</td> </tr> <tr> <td>vNIC SVT_Mgmt_B</td> <td>00:25:B5:00:A1:3C</td> <td>9</td> <td>2</td> <td>B</td> </tr> </tbody> </table>	Name	MAC Address	Desired Order	Actual Order	Fabric ID	vNIC SVT_Mgmt_A	00:25:B5:00:A1:0C	8	1	A	vNIC SVT_Mgmt_B	00:25:B5:00:A1:3C	9	2	B										
Name	MAC Address	Desired Order	Actual Order	Fabric ID																							
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vNIC SVT_Mgmt_B	00:25:B5:00:A1:3C	9	2	B																							
2	<p>Create SimpliVity storage and federation vNICs. VMware vMotion migration will occur over these vNICs as well.</p> <p>Configure 2 vNICs: on fabric A and fabric B. Do not configure fabric failover; ESXi NIC teaming will be used.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>MAC Address</th> <th>Desired Order</th> <th>Actual Order</th> <th>Fabric ID</th> </tr> </thead> <tbody> <tr> <td>vNIC SVT_Mgmt_A</td> <td>00:25:B5:00:A1:0C</td> <td>8</td> <td>1</td> <td>A</td> </tr> <tr> <td>vNIC SVT_Mgmt_B</td> <td>00:25:B5:00:A1:3C</td> <td>9</td> <td>2</td> <td>B</td> </tr> <tr> <td>vNIC SVT_Storage_A</td> <td>00:25:B5:00:A1:06</td> <td>10</td> <td>3</td> <td>A</td> </tr> <tr> <td>vNIC SVT_Storage_B</td> <td>00:25:B5:00:A1:17</td> <td>11</td> <td>4</td> <td>B</td> </tr> </tbody> </table>	Name	MAC Address	Desired Order	Actual Order	Fabric ID	vNIC SVT_Mgmt_A	00:25:B5:00:A1:0C	8	1	A	vNIC SVT_Mgmt_B	00:25:B5:00:A1:3C	9	2	B	vNIC SVT_Storage_A	00:25:B5:00:A1:06	10	3	A	vNIC SVT_Storage_B	00:25:B5:00:A1:17	11	4	B
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vNIC SVT_Mgmt_B	00:25:B5:00:A1:3C	9	2	B																							
vNIC SVT_Storage_A	00:25:B5:00:A1:06	10	3	A																							
vNIC SVT_Storage_B	00:25:B5:00:A1:17	11	4	B																							
3	<p>After you define and assign the Cisco UCS profile template, view the ESXi host network configuration.</p> <p>Build the ESXi host network as shown here.</p>	<p><b>View:</b> vSphere Standard Switch vSphere Distributed Switch</p> <p><b>Networking</b></p> <p>Standard Switch: vSwitch0</p> <ul style="list-style-type: none"> <li>Virtual Machine Port Group: VM Network</li> <li>VMkernel Port: VMkernel Port</li> <li>Management Network: vmk0 : 10.29.152.181</li> <li>Physical Adapters: vmnic1 10000 Full, vmnic0 10000 Full</li> </ul> <p>Standard Switch: vSwitch1</p> <ul style="list-style-type: none"> <li>Virtual Machine Port Group: StoragePortGrp (VLAN ID: 12)</li> <li>Virtual Machine Port Group: SVT_Federation (VLAN ID: 11)</li> <li>VMkernel Port: SVT_Storage (vmk1 : 192.168.2.50   VLAN ID: 12)</li> <li>Physical Adapters: vmnic3 10000 Full, vmnic2 10000 Full</li> </ul>																									

## Create a Service Profile Template

Create a new SimpliVity service profile template using the policies outlined in the previous steps. This document does not detail the steps for creating this new service profile template please refer to the Cisco UCS Manager GUI Configuration Guide at Cisco.com <http://www.cisco.com/c/en/us/support/servers-unified-computing/ucs-manager/products-installation-and-configuration-guides-list.html>

Create all the required service profiles needed for every SimpliVity host added to Cisco UCS Manager.

## Assign the Service Profile to a Host and Boot

The final step is to associate the service profiles created from the template with the SimpliVity-based Cisco UCS C240 M4 servers. Profiles can be automatically associated with a SimpliVity server pool or manually assigned.

Boot the server and continue with the OmniStack software configuration steps.

Figure 3 shows an example of a fully configured and operational Cisco UCS C240 M4SX server managed by Cisco UCS Manager as a SimpliVity cluster node.

**Figure 3.** Fully Configured Cisco UCS C240 M4SX Managed by Cisco UCS Manager as a SimpliVity Cluster Node

The screenshot displays the Cisco UCS Manager GUI for a server configuration. The top navigation bar includes tabs for General, Inventory, Virtual Machines, Hybrid Display, Installed Firmware, SEL Logs, CIMC Sessions, VIF Paths, Power Control Monitor, Faults, Events, FSM, Statistics, Temperatures, and Power. The main interface is divided into several panels:

- Fault Summary:** Shows four fault categories, each with a count of 0.
- Status:** Overall Status is **Ok**.
- Status Details:** Admin State: **In Service**, Discovery State: **Complete**, Avail State: **Unavailable**, Assoc State: **Associated**, Power State: **On**, Slot Status: **Equipped**, Check Point: **Discovered**.
- Actions:** A list of actions including Create Service Profile, Associate Service Profile, Set Desired Power State, Boot Server, Shutdown Server, Reset, Recover Server, Server Maintenance, KVM Console, SSH to CIMC for SoL, and Turn on Locator LED.
- Physical Display:** A photograph of the server rack.
- Properties:** ID: 8, Product Name: **Cisco UCS C240 M4SX**, Vendor: **Cisco Systems Inc**, Revision: 0, Name: [input field], User Label: [input field], UUID: **7a4d34f2-208b-11e1-0000-200000000003**, Service Profile: **org-root/org-SimpliVity/ls-SVT\_M4\_Host2**, Locator LED: .
- Summary:** Number of Processors: 2, Cores Enabled: 20, Cores: 20, Threads: 40, Effective Memory (MB): 262144, Total Memory (MB): 262144, Operating Memory Speed: 2133, Operating Memory Voltage: **Regular Voltage**, Adapters: 1, NICs: 4, HBAs: 0, Original UUID: **12ca80e7-7a52-4ccd-9197-0d0a37981e2a**.
- Expandable Sections:** Part Details, Connection Details, and Boot Order Details.

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## Install OmniStack Software

Refer to the SimpliVity supplied documentation *OmniCube for vSphere Client Admin Guide* for installation and configuration instructions to install the required software.

## For More Information

For more information, go to the OmniStack Integrated Solution with Cisco UCS page:

<https://www.simplivity.com/products/omnistack-cisco-ucs/>.



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