Nutanix Field Installation Guide for Cisco UCS Servers

12-Jul-2016

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Conventions

Convention	Description
variable_value	The action depends on a value that is unique to your environment.
`ncli> command`	The commands are executed in the Nutanix nCLI.
`user@host$ command`	The commands are executed as a non-privileged user (such as nutanix) in the system shell.
`root@host# command`	The commands are executed as the root user in the vSphere or Acropolis host shell.
`> command`	The commands are executed in the Hyper-V host shell.
`output`	The information is displayed as output from a command or in a log file.

Default Cluster Credentials

Interface	Target	Username	Password
Nutanix web console	Nutanix Controller VM	admin	admin
vSphere Web Client	ESXi host	root	nutanix/4u

Interface	Target	Username	Password
vSphere client	ESXi host	root	nutanix/4u
SSH client or console	ESXi host	root	nutanix/4u
SSH client or console	AHV host	root	nutanix/4u
SSH client or console	Hyper-V host	Administrator	nutanix/4u
SSH client	Nutanix Controller VM	nutanix	nutanix/4u
SSH client or console	Acropolis OpenStack Services VM (Nutanix OVM)	root	admin

Version

Last modified: July 12, 2016 (2016-07-12 1:44:59 GMT-7)

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Field Installation Overview

This chapter provides an overview of the preliminary tasks involved in preparing Cisco Unified Computing System (UCS) C-Series rack servers and the tasks involved in imaging the servers with Nutanix Foundation.

Deployment Workflow

The process of deploying Nutanix software on UCS C-Series servers can be divided into two distinct phases, as shown in the following figure. The documentation is organized to conform to this phased deployment to ensure ease of use.

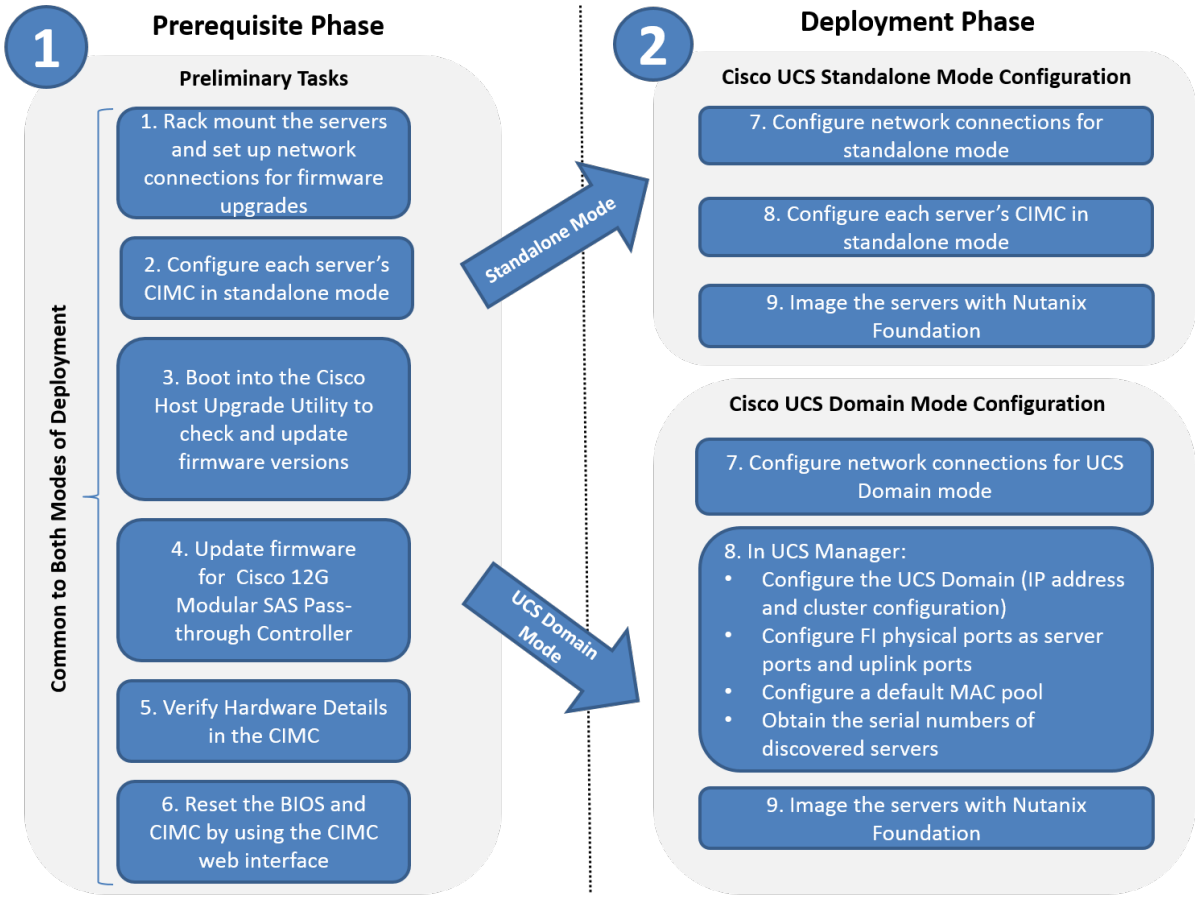

Figure: Deployment Workflow Diagram

Prerequisite Phase

The prerequisite phase consists of tasks that are common to the deployment process regardless of the mode in which you want to deploy the servers. The objective of this phase is to update the firmware versions on the C-Series servers to match the versions supported by Nutanix. At the end of the phase, you reset the BIOS and the CIMC on each server.

Deployment Phase

The set of tasks that you must perform in the deployment phase depends on the mode in which you want to deploy the servers, and is depicted in the deployment workflow diagram. The objective of this phase is to set up the servers in the desired mode (standalone or UCS Domain) and then image the servers by using Nutanix Foundation.

Cisco UCS C-Series Software and Firmware Compatibility

Before you image a Cisco UCS C-Series server by using Nutanix Foundation, make sure that the common prerequisites listed here are satisfied.

Cisco UCS C-Series Server Firmware Versions

Upgrade the firmware on the server components to the versions listed in the following tables:

Required Firmware and Software Versions for Cisco UCS C-Series Servers (Standalone Mode and UCS Domain Mode)

Component	Firmware or Software Version
Cisco Integrated Management Controller (CIMC)	2.0(10b)
BIOS	*C240 M4SX and C240 M4L* C240M4.2.0.10c.0.032320160820 *C220 M4S* C220M4.2.0.10c.0.032320160810
Intel I350 LOM	*C240 M4SX and C240 M4L* 0X80000B16-1.808.2 *C220 M4S* 0X80000B15-1.808.2
Cisco 12 Gbps Modular SAS HBA Pass-through	*Recommended Version* 11.00.06.00 *Minimum Required Version* 9.00.07
Cisco UCS MLOM	4.1(1d)

Component	Firmware or Software Version
Cisco UCS VIC 1227 Adapter	*UCS Domain Mode* 4.1(1d) *Standalone Mode* Not applicable
Intel X520 Dual Port 10Gb SFP+ Adapter	*Standalone Mode* 1.446.1 *UCS Domain Mode* Not applicable
Intel s3610 SSD (Cisco part number UCS-SD480G12S3-EP) firmware and revision number	*Firmware* G201CS01 *Revision number* CS01
SAS Expander	65.02.36.00
UCS Manager	3.1(1e)

Required Firmware Versions for HDDs and SSDs on Cisco UCS C-Series Servers (Standalone Mode and UCS Domain Mode)

HDD/SSD Name	Firmware Version
SSDSC2BB120G6k (ATA) (C240 M4SX and C240 M4L only)	CS01
SSDSC2BX480G4K (ATA)	CS01
ST2000NX0433 (SAS) (C240 M4SX and C220 M4S)	N003
ST4000NM0023 (SAS) (C240 M4L Only)	A005

Note: The Host Upgrade Utility (HUU) recognizes components sourced only from Cisco. Components sourced from other vendors might not register with the HUU.

Cisco Software Versions

Download the Cisco UCS Host Upgrade Utility for your hardware model.

UCS C220 M4 Rack Server
Download Cisco UCS Host Upgrade Utility 2.0(10b) from the *UCS C220 M4 Rack Server Software* page (file name: ucs-c220m4-huu-2.0.10b.iso).

UCS C240 M4 Rack Server
Download Cisco UCS Host Upgrade Utility 2.0(10b) from the *UCS C240 M4 Rack Server Software* page (file name: ucs-c240m4-huu-2.0.10b.iso).

For information about how to upgrade the firmware, see the Cisco Host Upgrade Utility 2.0(10b) User Guide at *http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/c/sw/lomug/2-0-x/b_huu_2_0_7.html*.

Nutanix Software Versions

Download the following software from the Nutanix support portal at *https://portal.nutanix.com/*.

Required Software Versions

Component	Firmware Version
Nutanix Acropolis Operating System (AOS)	4.6.2
Nutanix Foundation	Foundation 3.2.1
Nutanix Cluster Check (NCC)	2.2.5
Nutanix Acropolis Hypervisor (AHV)	host-bundle-el6.nutanix.20160217.2.tar.gz
	 **Note:** The AHV bundle is included in the Foundation VM.

Versions of Other Software

If you want to install VMware ESXi on the server, download VMware ESXi 6.0 Update 1a (Build 3073146). The details of the ISO file that you must download are as follows:

VMware ESXi Download Information

File Attribute	Value
Name	`VMware-VMvisor-Installer-6.0.0.update01-3073146.x86_64.iso`
Published MD5 Checksum	`153618d0e91135c3ec58c87fc5f5fb0d`

To verify that you have downloaded the correct ISO file, calculate the md5 checksum of the downloaded file and compare it with the published md5 checksum.

Supported Cisco UCS Hardware Models and Hardware Configuration

The following rack server models are supported:

- Cisco UCS C240-M4SX
- Cisco UCS C240-M4L
- Cisco UCS C220-M4S

The following fabric interconnects are supported:

- Cisco UCS 6248UP Fabric Interconnect
- Cisco UCS 6296UP Fabric Interconnect

The following network interface cards (NICs) are supported on standalone C-Series servers for uplink connectivity:

- Intel X520 Dual Port 10Gb SFP+ NICs.

Supported Modes of Operation

Nutanix supports a cluster of Cisco UCS C-Series rack servers running in one of the following modes:

- Standalone mode.
- UCS Domain mode with a pair of fabric interconnects in a cluster configuration.

Cisco UCS C220-M4S Hardware Compatibility

The Nutanix platform requires specific hardware to run on Cisco UCS servers. For firmware requirements, see *Cisco UCS C-Series Firmware Compatibility*.

Cisco UCS C220-M4S Hardware Compatibility

Model	C220-M4S (UCS C220 M4 SFF)
Size	1 Rack Unit, 8-drive, SFF
Nodes per server	1
Primary use case	VDI
Server compute (2 × Intel Haswell CPU per server)	E5-2620 v3 [12 cores / 2.4 GHz]
	E5-2640 v3 [16 cores / 2.6 GHz]
	E5-2667 v3 [16 cores / 3.2 GHz]
	E5-2650 v3 [20 cores / 2.3 GHz]
	E5-2660 v3 [20 cores / 2.6 GHz]
	E5-2658 v3 [24 cores / 2.2 GHz]
	E5-2680 v3 [24 cores / 2.5 GHz]
Server compute (2 × Intel Broadwell CPU per server)	E5-2637 v4 [8 cores / 3.5 GHz]
	E5-2643 v4 [12 cores / 3.4 GHz]
	E5-2620 v4 [16 cores / 2.1 GHz]
	E5-2667 v4 [16 cores / 3.2 GHz]
	E5-2640 v4 [20 cores / 2.4 GHz]
	E5-2650 v4 [24 cores / 2.2 GHz]
	E5-2680 v4 [28 cores / 2.4 GHz]
	E5-2695 v4 [36 cores / 2.1 GHz]
	E5-2699 v4 [44 cores / 2.2 GHz]
Storage Capacity (SSD)	2 × SSD [480 GB, 1.6 TB] (UCS-SD480G12S3-EP, UCS-SD16TB12S3-EP)
Storage Capacity (HDD)	Up to 6 × 2.5" HDD [1TB, 2TB] (UCS-HD1T7K12G, UCS-HD2T7K12G)

Model	C220-M4S (UCS C220 M4 SFF)
Memory for platforms using Intel Haswell CPUs	16GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X162RU-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB
	32GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X322RU-A) • 16 × 32GB = 512GB • 24 × 32GB = 768GB
Memory for platforms using Intel Broadwell CPUs	16GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X161RV-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB
	32GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X322RV-A) • 16 × 32GB = 512GB • 24 × 32GB = 768GB
Cisco UCS MLOM network interface	Cisco UCS VIC1227 VIC MLOM Dual Port 10Gb SFP+ (UCSC-MLOM-CSC-02)
Intel X520 network interface	Intel X520 Dual Port 10Gb SFP+ Adapter N2XX-AIPCI01
GPU card	N/A
Storage controller	Cisco 12Gbps Modular SAS HBA (UCSC-SAS12GHBA)
Boot device	2 × 64GB SD Card (UCS-SD-64G-S)
Power supply (2 per block)	770W AC hot-swappable power supply for 1U C-Series Rack Server (UCSC-PSU1-770W)
Supported hypervisors	• VMware ESXi 6.0 and 5.5 • Nutanix AHV

Cisco UCS C240-M4L Hardware Compatibility

The Nutanix platform requires specific hardware to run on Cisco UCS servers. For firmware requirements, see *Cisco UCS C-Series Firmware Compatibility*.

Cisco UCS C240-M4L Hardware Compatibility

Model	C240-M4L (UCS C240 M4 LFF)
Size	2 Rack Units, 12-drive, LFF
Nodes per server	1
Primary use case	Server virtualization
Server compute (2 × Intel Haswell CPU per server)	E5-2620 v3 [12 cores / 2.4 GHz]
	E5-2640 v3 [16 cores / 2.6 GHz]
	E5-2667 v3 [16 cores / 3.2 GHz]
	E5-2650 v3 [20 cores / 2.3 GHz]
	E5-2660 v3 [20 cores / 2.6 GHz]
	E5-2658 v3 [24 cores / 2.2 GHz]
	E5-2680 v3 [24 cores / 2.5 GHz]
Server compute (2 × Intel Broadwell CPU per server)	E5-2637 v4 [8 cores / 3.5 GHz]
	E5-2643 v4 [12 cores / 3.4 GHz]
	E5-2620 v4 [16 cores / 2.1 GHz]
	E5-2667 v4 [16 cores / 3.2 GHz]
	E5-2640 v4 [20 cores / 2.4 GHz]
	E5-2650 v4 [24 cores / 2.2 GHz]
	E5-2680 v4 [28 cores / 2.4 GHz]
	E5-2695 v4 [36 cores / 2.1 GHz]
	E5-2699 v4 [44 cores / 2.2 GHz]
Storage Capacity (SSD)	2 × SSD [480GB, 1.6 TB] (UCS-SD480G0KHY-EP, UCS-SD16TG0KHY-EP)
	Encrypted drives: 2 × SED-FIPS SSD [400GB] (UCS-SD400GBEAK9)
Storage Capacity (HDD)	Up to 10 × 3.5" HDD [2TB, 4TB] (UCS-HD2T7KL12G, UCS-HD4T7KS3-E)
	Encrypted drives: up to 10 × 3.5" HDD [4TB] (UCS-HD4TBK9)
Memory for platforms using Intel Haswell CPUs	16GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X162RU-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB

Model	C240-M4L (UCS C240 M4 LFF)
	32GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X322RU-A) • 16 × 32GB = 512GB • 24 × 32GB = 768GB
Memory for platforms using Intel Broadwell CPUs	16GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X161RV-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB
	32GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X322RV-A) • 16 × 32GB = 512GB • 24 × 32GB =768GB
Cisco UCS MLOM network interface	Cisco UCS VIC1227 VIC MLOM Dual Port 10Gb SFP+ (UCSC-MLOM-CSC-02)
Intel X520 network interface	Intel X520 Dual Port 10Gb SFP+ Adapter N2XX-AIPCI01
GPU card	N/A
Storage controller	Cisco 12Gbps Modular SAS HBA (UCSC-SAS12GHBA)
Boot device	120GB 2.5" Enterprise Value 6G SATA SSD (boot) (UCS-SD120GBKS4-EB)
Power supply (2 per block)	1200W / 800W V2 AC hot-swappable power supply for 2U C-Series Servers (UCSC-PSU2V2-1200W) 1400W V2 AC hot-swappable power supply (200 - 240V) 2U and 4U C Series (UCSC-PSU2V2-1400W)
Supported hypervisors	• VMware ESXi 6.0 and 5.5 • Nutanix AHV • Microsoft Hyper-V

Cisco UCS C240-M4SX Hardware Compatibility

The Nutanix platform requires specific hardware to run on Cisco UCS servers. For firmware requirements, see *Cisco UCS C-Series Firmware Compatibility*.

Cisco UCS C240-M4SX Hardware Compatibility

Model	C240-M4SX (UCS C240 M4 SFF)
Size	2 Rack Units, 24-drive, SFF
Nodes per server	1
Primary use case	High performance
Server compute (2 × Intel Haswell CPU per server)	E5-2620 v3 [12 cores / 2.4 GHz]
	E5-2640 v3 [16 cores / 2.6 GHz]
	E5-2667 v3 [16 cores / 3.2 GHz]
	E5-2650 v3 [20 cores / 2.3 GHz]
	E5-2660 v3 [20 cores / 2.6 GHz]
	E5-2658 v3 [24 cores / 2.2 GHz]
	E5-2680 v3 [24 cores / 2.5 GHz]
Server compute (2 × Intel Broadwell CPU per server)	E5-2637 v4 [8 cores / 3.5 GHz]
	E5-2643 v4 [12 cores / 3.4 GHz]
	E5-2620 v4 [16 cores / 2.1 GHz]
	E5-2667 v4 [16 cores / 3.2 GHz]
	E5-2640 v4 [20 cores / 2.4 GHz]
	E5-2650 v4 [24 cores / 2.2 GHz]
	E5-2680 v4 [28 cores / 2.4 GHz]
	E5-2695 v4 [36 cores / 2.1 GHz]
	E5-2699 v4 [44 cores / 2.2 GHz]
Storage Capacity (SSD)	4 × SSD [480 GB, 1.6 TB] (UCS-SD480G12S3-EP, UCS-SD16TB12S3-EP)
Storage Capacity (HDD)	Up to 20 × 2.5" HDD [1TB, 2TB] (UCS-HD1T7K12G, UCS-HD2T7K12G)
Memory for platforms using Intel Haswell CPUs	16GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X162RU-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB
	32GB DDR-2133, RDIMM, 1.2V (UCS-MR-1X322RU-A) • 16 × 32GB = 512GB • 24 × 32GB = 768GB

Model	C240-M4SX (UCS C240 M4 SFF)
Memory for platforms using Intel Broadwell CPUs	16GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X161RV-A) • 8 × 16GB = 128GB • 16 × 16GB = 256GB
	32GB DDR-2400, RDIMM, 1.2V (UCS-MR-1X322RV-A) • 16 × 32GB = 512GB • 24 × 32GB = 768GB
Cisco UCS MLOM network interface	Cisco UCS VIC1227 VIC MLOM Dual Port 10Gb SFP+ (UCSC-MLOM-CSC-02)
Intel X520 network interface	Intel X520 Dual Port 10Gb SFP+ Adapter N2XX-AIPCI01
GPU card	N/A
Storage controller	Cisco 12Gbps Modular SAS HBA (UCSC-SAS12GHBA)
Boot device	120GB 2.5" Enterprise Value 6G SATA SSD (boot) (UCS-SD120GBKS4-EB)
Power supply (2 per block)	1200W / 800W V2 AC hot-swappable power supply for 2U C-Series Servers (UCSC-PSU2V2-1200W) 1400W V2 AC hot-swappable power supply (200 - 240V) 2U and 4U C Series (UCSC-PSU2V2-1400W)
Supported hypervisors	• VMware ESXi 6.0 and 5.5 • Nutanix AHV • Microsoft Hyper-V

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Preliminary Tasks

Preliminary tasks involve rack mounting the servers and connecting them to an upstream, top-of-rack L2 switch, upgrading the firmware by using the recommended version of the Cisco Host Upgrade Utility, and then resetting the BIOS and Cisco Integrated Management Controller (CIMC) in preparation for the deployment phase. Perform this procedure on each C-Series server regardless of the mode in which you plan to deploy the servers.

Summary: Performing Preliminary Tasks

Before you begin: Rack mount the servers.

For information about rack mounting your server, see the "Installing the Server" chapter in the *Server Installation and Service Guide* for your hardware model. A complete list of guides is available at *Cisco UCS C-Series Rack Servers Install and Upgrade Guides*.

To update the firmware on a C-Series server, do the following:

1. Set up network connections for the firmware upgrade procedure. See *Setting Up Network Connections for Firmware Upgrades* on page 16.
2. From the attached console, configure the CIMC. See *Configuring Cisco Integrated Management Controller (CIMC) Settings* on page 22.
3. From the attached console or from a KVM console, boot into the HUU and upgrade the firmware on the server.

   For supported firmware versions, see *Cisco UCS C-Series Server Firmware Versions*. For information about how to use Cisco Host Upgrade Utility 2.0(10b) to upgrade server firmware, see the *Cisco Host Upgrade Utility 2.0(7) User Guide*.

   Note: When you access the CIMC web console for the first time, the CIMC forces you to change the password. Make a note of the password that you specify.
4. From the CIMC web console, update the firmware of the Cisco 12G Modular SAS Pass-through Controller. See *Upgrading the Cisco 12 Gbps Modular SAS HBA Firmware* on page 16.
5. Verify hardware details in the CIMC web console. See *Verifying Hardware Details in the CIMC* on page 20.
6. Reset the BIOS to factory defaults. See "Restoring BIOS Manufacturing Custom Defaults" in *Configuring BIOS Settings*.
7. Reset the CIMC to factory defaults. See *Resetting Cisco IMC to Factory Defaults*.

Setting Up Network Connections for Firmware Upgrades

To set up the network connections for firmware upgrades, do the following:

1. Connect the shared LOM interface labelled **1** to the upstream, top-of-rack L2 switch by using an RJ-45 Ethernet cable. The shared LOM port is highlighted in the following figure:

   After you assign this interface an IP address in subsequent steps, you use this connection to access the CIMC for additional configuration tasks.

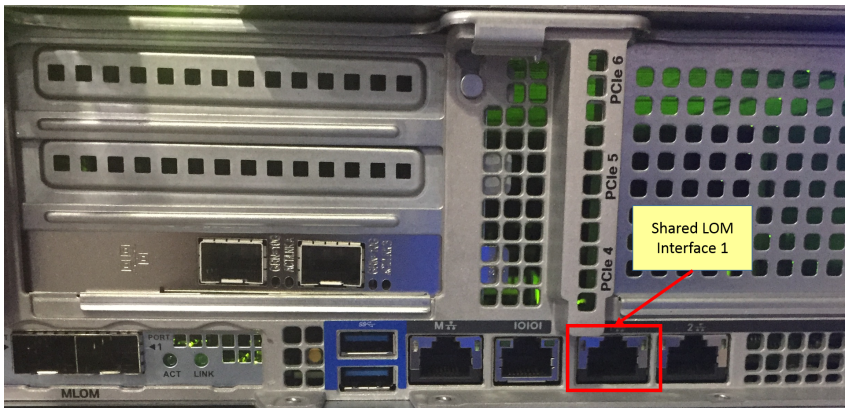

Figure: Shared LOM Interface 1 on the Cisco UCS C240 M4 High-Density SFF Rack Server

2. Connect a USB keyboard and VGA monitor to the Cisco UCS server.

   You use the keyboard and monitor for initial configuration of the CIMC.

   See the section titled "Local Connection Procedure" in the *Server Installation and Service Guide* for your hardware model. A complete list of guides is available at *Cisco UCS C-Series Rack Servers Install and Upgrade Guides*.

   Note: Refer to the Cisco documentation only for information about how to connect a keyboard and monitor to the server. For information about how to configure the CIMC, perform the tasks described in this documentation.

Upgrading the Cisco 12 Gbps Modular SAS HBA Firmware

Nutanix recommends firmware version 11.00.06.00 for the Cisco 12 Gbps Modular SAS HBA. However, Cisco has not released version 11.00.06.00 yet, and you cannot upgrade the Modular SAS HBA to that version by using the Cisco Host Upgrade Utility (HUU). You must obtain the firmware from Cisco and use the following procedure to upgrade the firmware on the Modular SAS HBA.

Before you begin: Download the firmware to the workstation that is connected to the UCS server network through the L2 switch.

To upgrade the HBA firmware, do the following:

1. Download the following Linux disk image to the workstation: *http://earth.corp.nutanix.com/hw_eng/Data/ISO/ucs-fwupdate-centos-mini.iso*
2. In a browser, log in to the CIMC web console by entering the CIMC IP address and the user name and password that you specified during the initial configuration of the CIMC.
3. In the toolbar, click **Launch KVM Console** to launch the KVM Console.

4. In the KVM Console, do the following:

   a. Click **Virtual Media**.

   b. To start a vMedia session that allows you to attach the Linux image file from your local computer, click **Activate Virtual Devices**. If you have not allowed unsecured connections, the CIMC web console prompts you to accept the session. Click **Accept this session**.

   c. Click **Map CD/DVD in Virtual Media** and select the downloaded Linux image file.

   d. Start the server and press **F6** when prompted to open the boot menu screen. On the boot menu screen, choose **Cisco vKVM-Mapped vDVD1.22** and press **Enter**.
   The server boots from the Linux image.

5. Log in to the server with the user name `root` and password `nutanix/4u`.
   Your current working directory is set to `/root`. The `/root` directory contains a `UCSC_SAS12GHBA_11.00.00.06` directory that contains files for firmware version 11.00.06.00.

6. Change your working directory to the `UCSC_SAS12GHBA_11.00.00.06` directory.
   The directory contains the following files:

   - sas3flash
   - UCSC-SAS12GHBA.fw
   - mptsas3.rom
   - mpt3x64.rom

7. List information about the HBA.

   ```
   root@localhost# ./sas3flash -list
   ```

   Also, to verify the update process, run this command after you run each of the subsequent commands.

8. Flash the firmware image.

   ```
   root@localhost# ./sas3flash –f UCSC-SAS12GHBA.fw
   ```

```
[root@localhost ~]#
[root@localhost ~]# ./sas3flash -f UCSC-SAS12GHBA.fw
Avago Technologies SAS3 Flash Utility
Version 09.00.00.00 (2015.02.03)
Copyright 2008-2015 Avago Technologies. All rights reserved.

        Adapter Selected is a Avago SAS: SAS3108_1(C0)

        Executing Operation: Flash Firmware Image

                Firmware Image has a Valid Checksum.
                Firmware Version 11.00.04.00
                Firmware Image compatible with Controller.

                Valid NVDATA Image found.
                NVDATA Version 0b.01.00.00
                Checking for a compatible NVData image...

                NVDATA Device ID and Chip Revision match verified.
                NVDATA Versions Compatible.
                Valid Initialization Image verified.
                Valid BootLoader Image verified.

                Beginning Firmware Download...
                Firmware Download Successful.

                Verifying Download...

                Firmware Flash Successful.

                Resetting Adapter...
                Adapter Successfully Reset.

        Finished Processing Commands Successfully.
        Exiting SAS3Flash.
[root@localhost ~]#
```

Figure: Output from Flashing the Firmware Image

9. Flash the BIOS image (BIOS version).

```
root@localhost# ./sas3flash -b mptsas3.rom
```

```
[root@localhost ~]#
[root@localhost ~]# ./sas3flash -b mptsas3.rom
Avago Technologies SAS3 Flash Utility
Version 09.00.00.00 (2015.02.03)
Copyright 2008-2015 Avago Technologies. All rights reserved.

        Adapter Selected is a Avago SAS: SAS3108_1(C0)

        Executing Operation: Flash BIOS Image

                Validating BIOS Image...

                BIOS Header Signature is Valid

                BIOS Image has a Valid Checksum.

                BIOS PCI Structure Signature Valid.

                BIOS Image Compatible with the SAS Controller.

                Attempting to Flash BIOS Image...

                Verifying Download...


                Flash BIOS Image Successful.

                Updated BIOS Version in BIOS Page 3.

        Finished Processing Commands Successfully.
        Exiting SAS3Flash.
[root@localhost ~]#
```

Figure: Output from Flashing the BIOS Image (BIOS Version)

10. Flash the BIOS image (UEFI BSD version).

```
root@localhost# ./sas3flash -b mpt3x64.rom
```

```
[root@localhost ~]# ./sas3flash -b mpt3x64.rom
Avago Technologies SAS3 Flash Utility
Version 09.00.00.00 (2015.02.03)
Copyright 2008-2015 Avago Technologies. All rights reserved.

        Adapter Selected is a Avago SAS: SAS3108_1(C0)

        Executing Operation: Flash BIOS Image

                Validating BIOS Image...

                BIOS Header Signature is Valid

                BIOS Image has a Valid Checksum.

                BIOS PCI Structure Signature Valid.

                BIOS Image Compatible with the SAS Controller.

                Attempting to Flash BIOS Image...

                Verifying Download...

                Flash BIOS Image Successful.

                Updated BIOS Version in BIOS Page 3.

        Finished Processing Commands Successfully.
        Exiting SAS3Flash.
[root@localhost ~]#
```

Figure: Output from Flashing the BIOS Image (UEFI BSD Version)

11. Verify the update a final time.

```
root@localhost# ./sas3flash -list
```

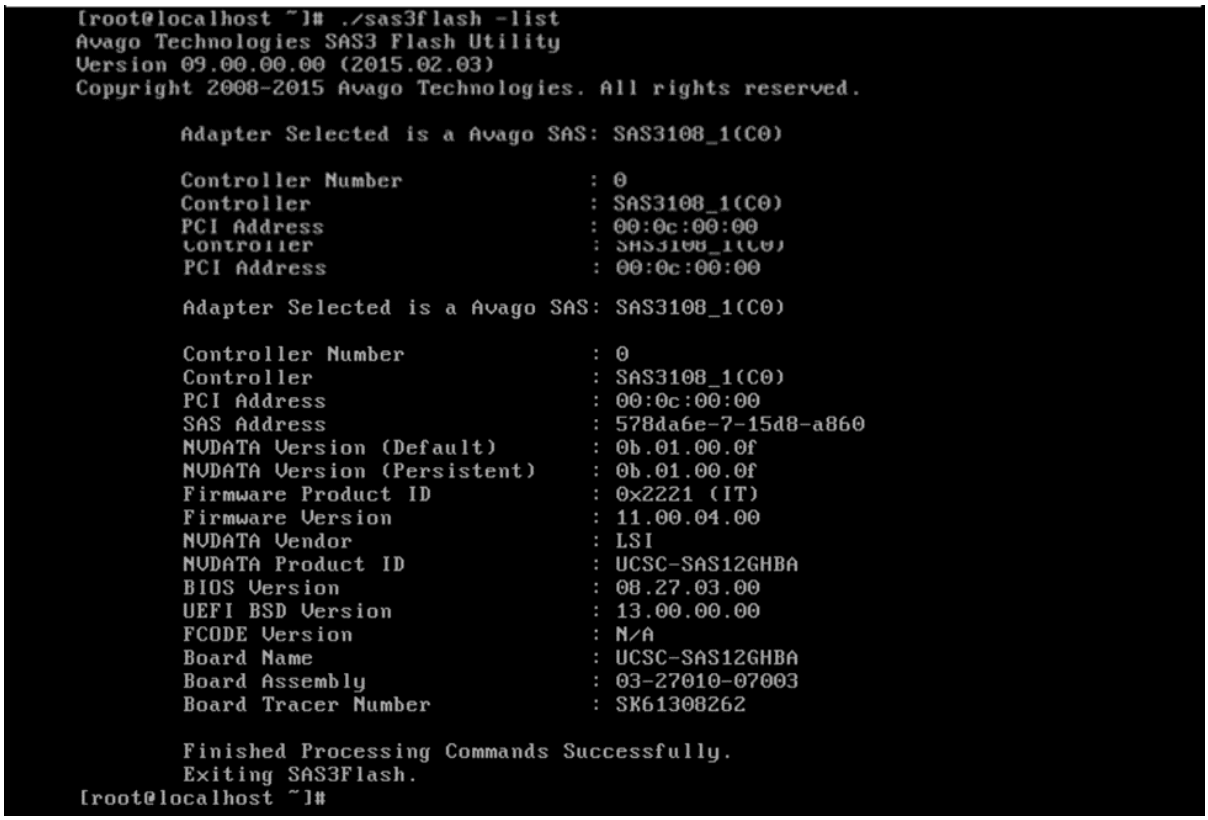

Figure: Update Verification Output

12. Restart the UCS server and verify that the HBA is detected in POST and the BIOS.
13. Close the KVM Console.

Verifying Hardware Details in the CIMC

Before you begin: Log in to the CIMC web console.

To verify hardware details in the CIMC web console, do the following:

1. If you are configuring a C220-M4S server, verify that two SD cards have been detected. One SD card must be detected in slot-1 and the other must be detected in slot-2, as shown in the following figure. This check is not necessary for C240 M4SX and C240 M4L servers:

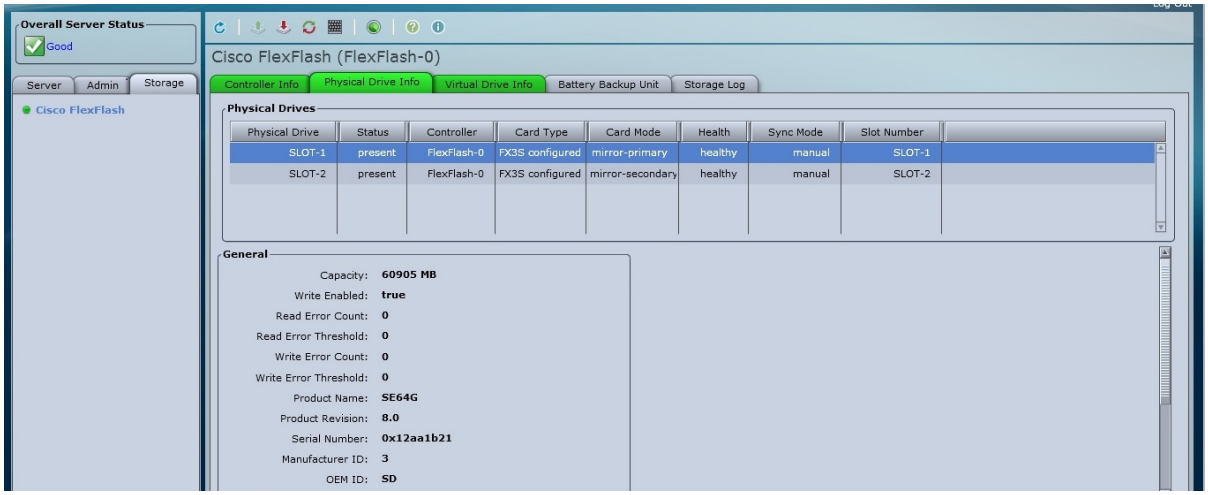

Figure: Verification for Dual SD Cards

2. If you are configuring a C240 M4L or C240 M4SX server, verify that the PCH SATA mode is set to `AHCI`. In the CIMC web console, go to **Server** > **BIOS** > **Configure BIOS**, and then check the **PCH SATA Mode** setting.

   This parameter must be set to AHCI before you use Foundation to image the servers.

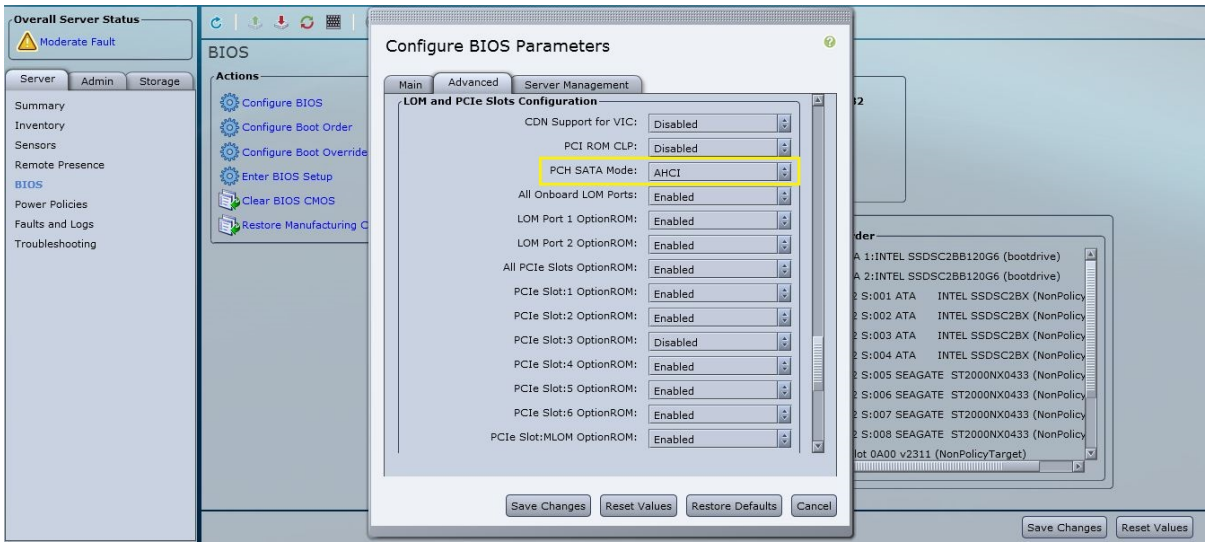

Figure: AHCI Setting for the PCH SATA Mode

3

Cisco UCS Standalone Mode Configuration

In the standalone mode, the Intel X520 Dual Port 10Gb SFP+ NICs on the C-Series servers are connected directly to the top-of-rack 10 GbE switch. The C-Series servers are not integrated with other Cisco UCS components, such as Cisco UCS fabric interconnects (FIs), fabric extenders (FEXes), or Cisco UCS Manager software. The servers are managed by the use of the Cisco Integrated Management Controller (CIMC) alone.

Setting Up Network Connections for Standalone Mode

To set up the network connections for standalone mode, do the following:

1. Connect the shared LOM interface labelled **1** to the upstream, top-of-rack L2 switch by using an RJ-45 Ethernet cable.

   In the prerequisite (firmware upgrade) phase, this connection was used to run the Cisco HUU.

2. Optionally, you can connect the Intel X520 Dual Port 1Gb SFP+ NIC to the L2 switch.

3. Connect a keyboard and VGA monitor to the UCS server, as described in the section titled "Local Connection Procedure" in the "Initial Server Setup" chapter of the *Server Installation and Service Guide* for your hardware model. A complete list of guides is available at *Cisco UCS C-Series Rack Servers Install and Upgrade Guides*.

   

   Note: Refer to the Cisco documentation only for information about how to connect a keyboard and monitor to the server. For information about how to configure the CIMC, perform the tasks described in this documentation.

4. Connect the Intel NIC on the UCS server to the top-of-rack switch by using a 10 GbE SFP+ Ethernet cable.

Configuring Cisco Integrated Management Controller (CIMC) Settings

Configure the Cisco IMC (CIMC) settings on each Cisco UCS C-Series server that you plan to add to the Nutanix cluster.

To configure the CIMC settings on a Cisco UCS C-Series server, do the following:

1. Turn on the server.

2. At the BIOS screen, press **F8** to access the CIMC utility.
   The CIMC utility is launched. If you are accessing the CIMC utility for the first time, the BIOS displays a message to indicate that the IP address of the CIMC interface could not be obtained. This is expected because the CIMC is not configured yet.

   The CIMC utility appears with default settings.

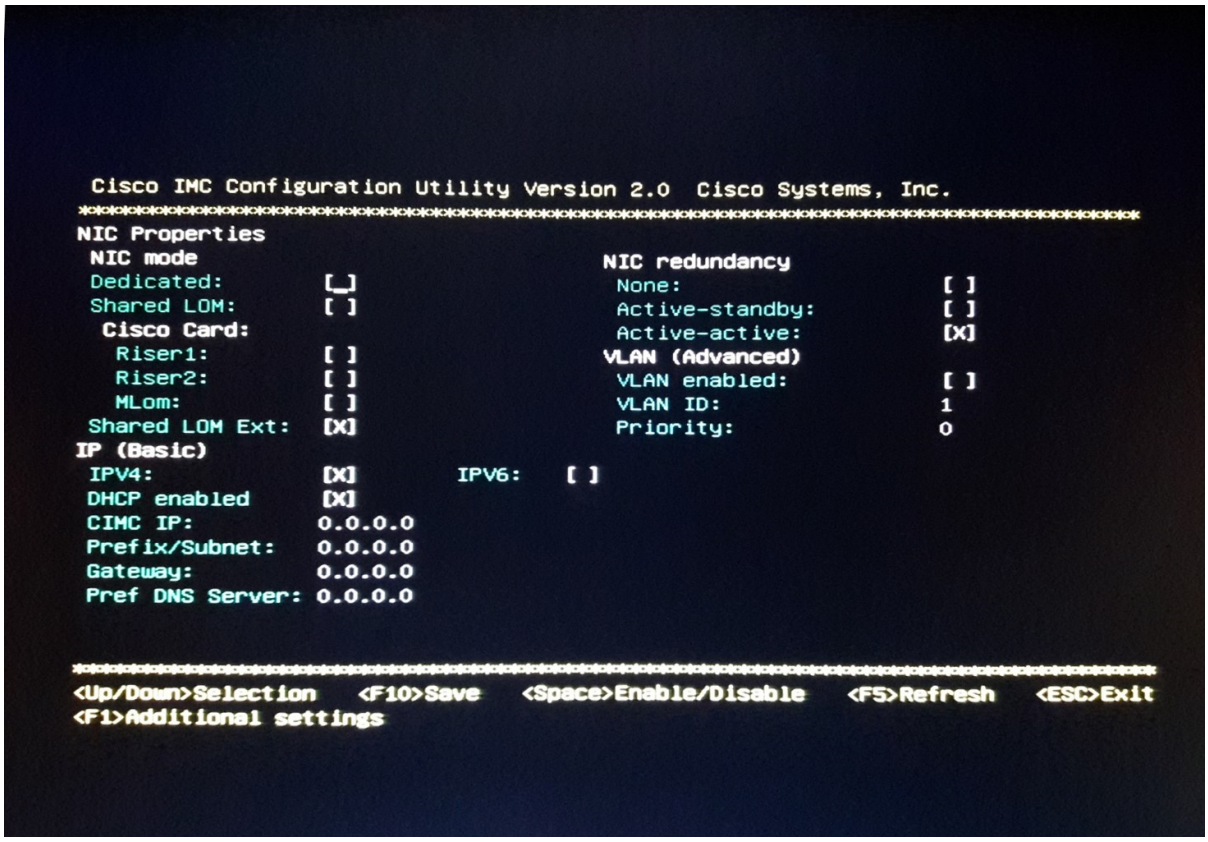

Figure: CIMC Default Settings

3. In **IP (Basic)**, configure IP settings:

   a. Clear **DHCP enabled**.

   b. Specify a static IPv4 address, subnet mask, gateway, and preferred DNS server for the CIMC.

   The following figure shows the CIMC utility with the desired settings and sample values:

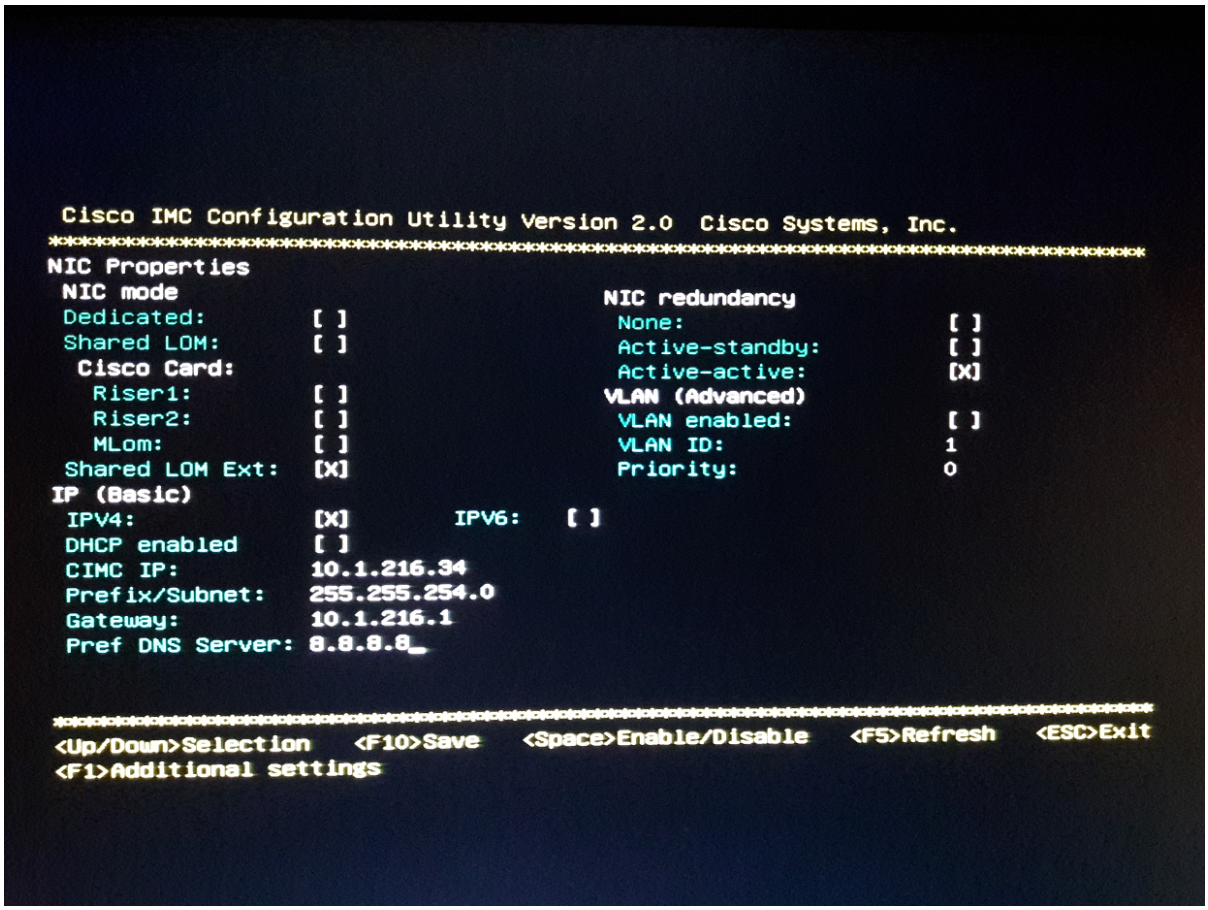

Figure: CIMC Modified Settings

4. Press **F10** to save the CIMC configuration.
   The CIMC utility might need up to a minute to save the configuration.

5. Log in to the CIMC GUI and change the CIMC password.

   a. Connect a workstation to the subnet to which the CIMC IP address belongs.

   b. In a web browser on the workstation, enter the IP address that you assigned to the CIMC during initial setup.

   c. On the login page, enter the default user name (`admin`) and default password (`password`), and then click **Log In**.
      The Change Password dialog box appears.

   d. In **New Password** and **Confirm Password**, enter a new password.

   e. Click **Save Changes**.

   The CIMC GUI forces you to change the CIMC password when you log in for the first time. Logging in to the CIMC GUI and changing the password before you use Nutanix Foundation ensures that you do not have to change the password when Foundation is imaging the servers, a step that disrupts the imaging process.

Imaging C-Series Servers in Standalone Mode

Use Nutanix Foundation to image the server with the desired hypervisor and AOS version.

Before you begin: Prepare the installation environment as described in *Imaging Bare Metal Nodes*.

> **Note:** Do not perform the tasks described in the "Setting Up the Network" section and subsequent sections.

To image C-Series servers in standalone mode, do the following:

1. Log on to the Foundation VM.
2. Click the Nutanix Foundation icon on the Foundation VM desktop to start the Foundation GUI.
   The **Block & Node Config** page is displayed and Foundation searches for nodes in the subnet.

   Before you proceed, make sure that you do not select **Switch to software-only installation** on this page. That option is for UCS C-Series servers running in the UCS Domain mode.
3. Do one of the following:
   a. If you are imaging servers that have factory default settings, click **Add Blocks** without waiting for the discovery process to complete, and then do the following:

      > **Note:** If the user interface does not display the block and node table within 1–2 minutes, you can stop discovery by selecting the **Switch to software-only installation** check box and then clearing the check box.

      1. Click **Add Blocks**.
      2. In the dialog box that is displayed, enter the number of blocks and the number of blocks per node.

         > **Note:** For Cisco UCS C-Series servers, the number of blocks equals the number of servers you want to image and the number of nodes per block is always equal to `1`.

      3. Click **Create**.

         The **Block & Node Config** page displays a row for each server you need to add, with dummy entries in the IPMI MAC Address column.
      4. In the IPMI MAC Address column, replace the dummy MAC addresses with the actual MAC addresses of the servers. To obtain the actual MAC addresses of the servers, in the CIMC web console, go to **Admin** > **Network** > **Network Settings**.

   b. If the servers do not have factory default settings (that is, if servers have already been deployed with Nutanix software running on them), wait for the discovery process to complete and list available nodes.
4. In the **Position** column, select the check boxes for the nodes that you want to image.
5. Enter the following information in each row of the table, and then click **Next**:
   - **IPMI MAC Address**. Valid MAC addresses of the servers.
   - **IPMI IP**. IP address of the CIMC on the C-Series servers.
   - **Hypervisor IP**. IP address that you want to assign to the hypervisor host.
   - **CVM IP**. IP address for the Controller VM.

   > **Note:** If the CIMC, hypervisor, and Controller VM IP addresses that you want to assign are contiguous, enter the first IP address in the cell immediately below the column header. The Foundation GUI generates the other CIMC IP addresses for you.

6. On the **Global Config** page, enter network and authentication information for the IPMI (CIMC for Cisco UCS C-Series servers) interface, hypervisor, and Controller VM, and then click **Next**.
7. On the **Image Selection** page, select the hypervisor and AOS package with which you want to image the servers.
8. If you want to create a cluster during the imaging process, click **Create New Cluster**, select the servers that you want to include in the cluster.
9. Click **Run Installation**.
   Foundation images the C-Series servers with the selected hypervisor and AOS version.

   

   Note: If the first attempt to run the installation fails because of IPMI configuration failure, ignore the failure and click **Image Nodes**. This second attempt should successfully start the imaging process.

What to do next: Optionally, after you install a hypervisor and AOS on the server, you can configure the CIMC to use the dedicated management port and then physically move the Ethernet cable to the dedicated management port. To configure the CIMC to use the dedicated management port, in the CIMC, set the NIC mode to `Dedicated` and the NIC redundancy to `None`. For information about these settings, see the section titled "Initial Server Setup" in the "Installing the Server" chapter of the *Install and Upgrade Guide* for your server model. A complete list of Cisco UCS C-Series server installation and service guides is available at *Install and Upgrade Guides*.

After you configure the CIMC for the first time, you can access the CIMC GUI to perform subsequent administrative tasks. To access the CIMC GUI, in a web browser, enter the IP address that you configured for the CIMC during initial setup, and then log in with the user name `admin` and the password that you specified during initial setup.

4

Cisco UCS Domain Mode Configuration

Cisco UCS Domain mode configuration involves setting up a pair of fabric interconnects (FIs) in a cluster configuration. You configure one fabric interconnect as a primary fabric interconnect and the other fabric interconnect as a secondary fabric interconnect. For high availability and redundancy, the two fabric interconnects are linked to each other by the use of two Ethernet cables.

To run Nutanix software, each C-Series server is connected directly to each of the fabric interconnects without the use of intermediary FEXes. The servers are managed from the UCS Manager software running on the fabric interconnects and not by the CIMC.

Setting Up Network Connections for UCS Domain Mode

The connections in this procedure use standard RJ-45 Ethernet cables.

Note: If you want to configure high availability in the deployment, before you begin this procedure, see *Configuring High Availability in a UCS Domain Mode Deployment* on page 32.

To set up network connections for UCS Domain mode, do the following:

1. Configure the fabric interconnects to function in cluster mode.
   a. Connect the **L1** and **L2** ports on one fabric interconnect to the **L1** and **L2** ports on the other fabric interconnect (L1 to L1 and L2 to L2).

      The following figure shows the L1 and L2 ports on the front panel of a Cisco UCS 6248UP Fabric Interconnect:

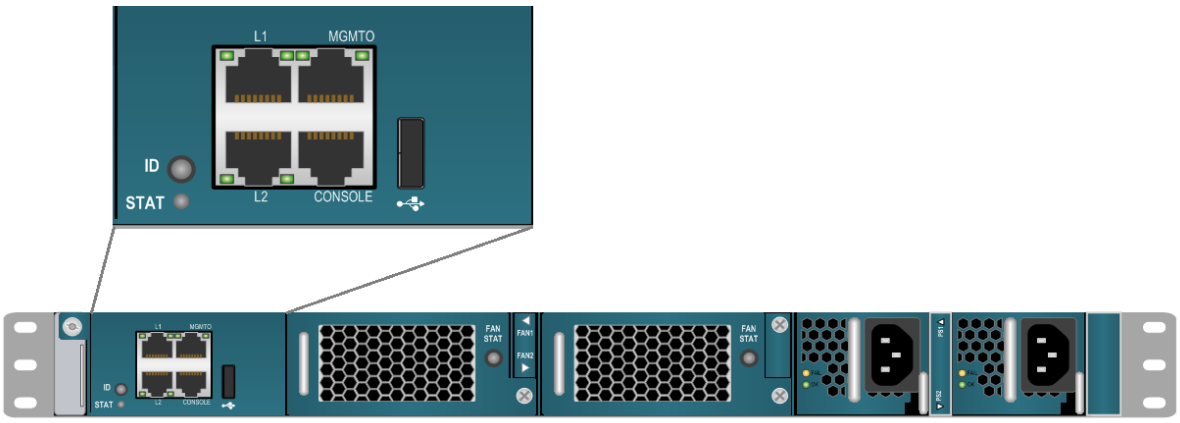

Figure: L1 and L2 Ports on the Front Panel of a Cisco UCS 6248UP Fabric Interconnect

2. Connect the management port on the front panel of each fabric interconnect to the upstream L2 switch. The management port is the port labeled **MGMT0**.
3. For initial configuration and IP address assignments, connect a workstation to the serial console port labeled **Console** on the front panel of the fabric interconnect.

4. For uplink connectivity, use a 10 Gbps SFP+ Ethernet cable to connect any one of the ports on the rear panel of each fabric interconnect to the SFP port on the L2 switch.

   Make a note of which fabric interconnect ports are connected to the upstream switch. You will need this information when designating fabric interconnect port as an uplink Ethernet port in UCS Manager.

5. Connect one Cisco Virtual Interface Card (VIC) port on a C-Series server to a port on the rear panel of one fabric interconnect, and then connect the other VIC port to a port on the rear panel of the other fabric interconnect. In this way, connect each C-Series server to both fabric interconnects.

   Make a note of which fabric interconnect ports are connected to the C-Series servers. You will need this information when designating fabric interconnect ports as server ports in UCS Manager. The following figure shows the VIC cards on the rear panel of a Cisco UCS C240 M4 High-Density SFF Rack Server:

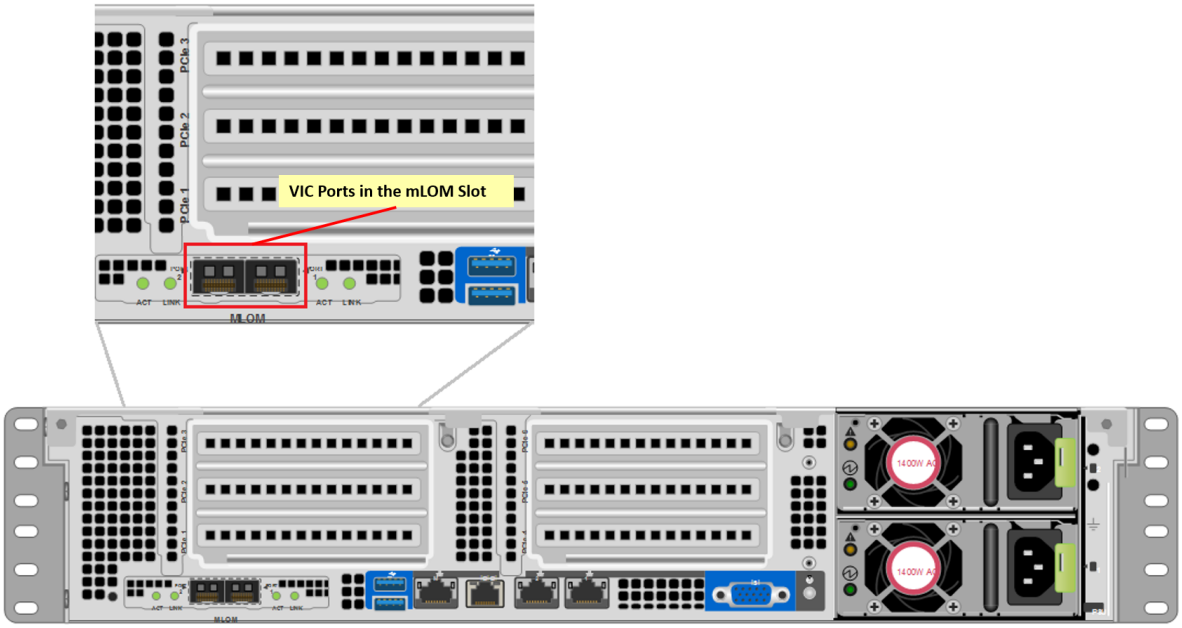

Figure: VIC Ports on the Rear Panel of the Cisco UCS C240 M4 High-Density SFF Rack Server

The following figure shows the resulting network topology if you use four C-Series servers:

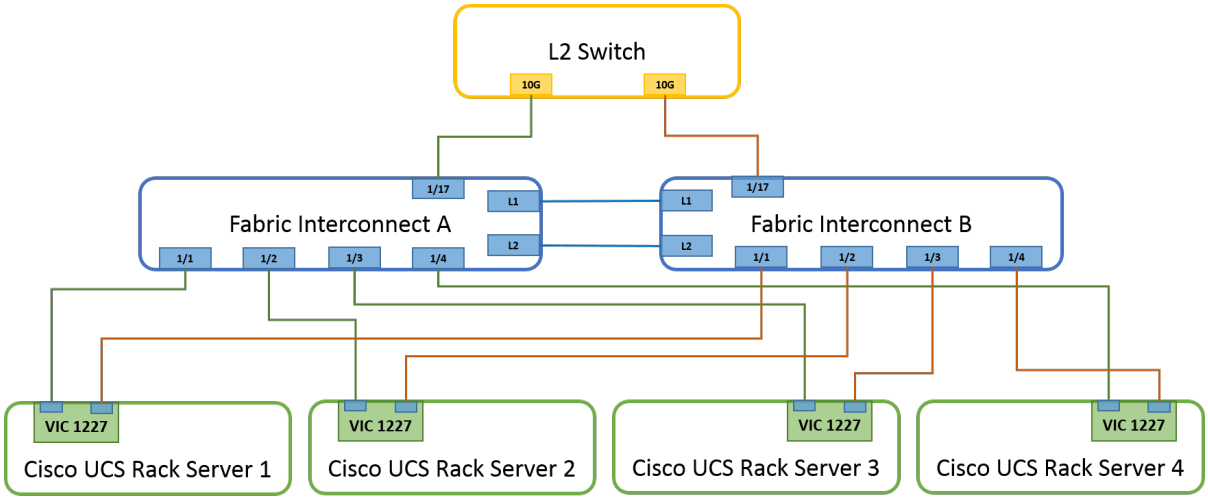

Figure: Network Topology

Performing Initial Configuration on the Fabric Interconnects

Perform these initial configuration tasks on both fabric interconnects.

To perform initial configuration on both fabric interconnects, do the following:

1. Configure one fabric interconnect as the primary and the other fabric interconnect as the subordinate. See *Console Setup*.
2. Configure uplink ports and server ports on each fabric interconnect. See the "Configuring Server Ports" and "Configuring Uplink Ethernet Ports" sections (respectively) in *LAN Ports and Port Channels*.
3. Make sure that a sufficient number of MAC addresses is available in the default MAC pool. See *MAC Pools*.

   You need one MAC address for each VIC port in use. If you are setting up four C-Series servers, and if each server uses two VIC ports, you need at least eight MAC addresses in the default MAC pool.
4. Clear any service profile and service template configurations that might be associated with the C-Series servers. See *Service Profiles*.

Imaging C-Series Servers in UCS Domain Mode

Use Nutanix Foundation to image the C-Series servers with the desired hypervisor and AOS version.

Before you begin: Prepare the installation environment as described in *Imaging Bare Metal Nodes*.

Note: Do not perform the tasks described in the "Setting Up the Network" section and subsequent sections.

To image the UCS C-Series servers with Nutanix Foundation, do the following:

1. Log on to the Foundation VM.
2. Click the Nutanix Foundation icon on the Foundation VM desktop to start the Foundation GUI.
3. On the **Block & Node Config** page, select **Switch to software-only installation**.
4. At the warning about UCS servers requiring bare metal imaging and the consequent clearing of discovered servers, click **Yes**.
5. Click **Add Blocks**.
6. In the dialog box that is displayed, do the following:
   a. In **Number of Blocks**, enter the number of C-Series servers that you want to add to the domain.
   b. In **Nodes per Block**, enter 1.

      

      Note: The number of nodes per block for a Cisco UCS C-Series server is always 1.

   c. Click **Create**.
      The Block & Node Config page displays the UCS servers that were added.
7. For each server that you want to image, select the check box in the **Position** column, and then enter the server's serial number in the **Node Serial** column.

The serial number of each server is available in UCS Manager. To obtain the serial number of a server, log in to UCS Manager, go to **Equipment** > **Equipment** > **Rack Mounts** > **Servers**, and then click the server. Obtain its serial number from the **General** tab in right pane. The following figure shows the location of a server's serial number:

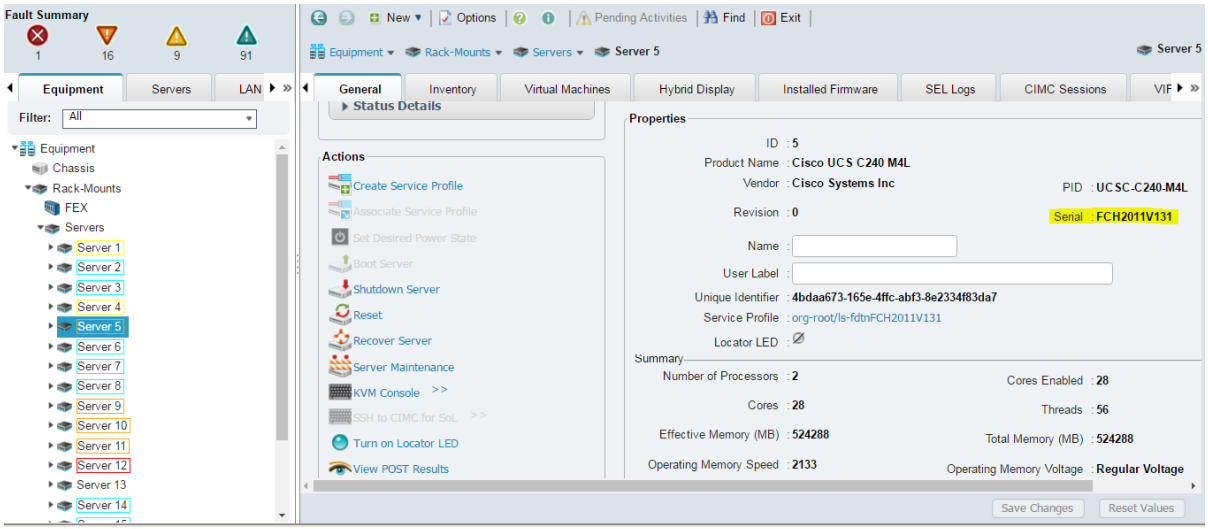

Figure: Location of the Serial Number of a C-Series Server

8. Specify the IPMI IP address, hypervisor IP address, and Controller VM IP address ranges, and then click **Next**.

> **Note:** In the IPMI column, enter the IP address of the Cisco IMC (CIMC) on each server.

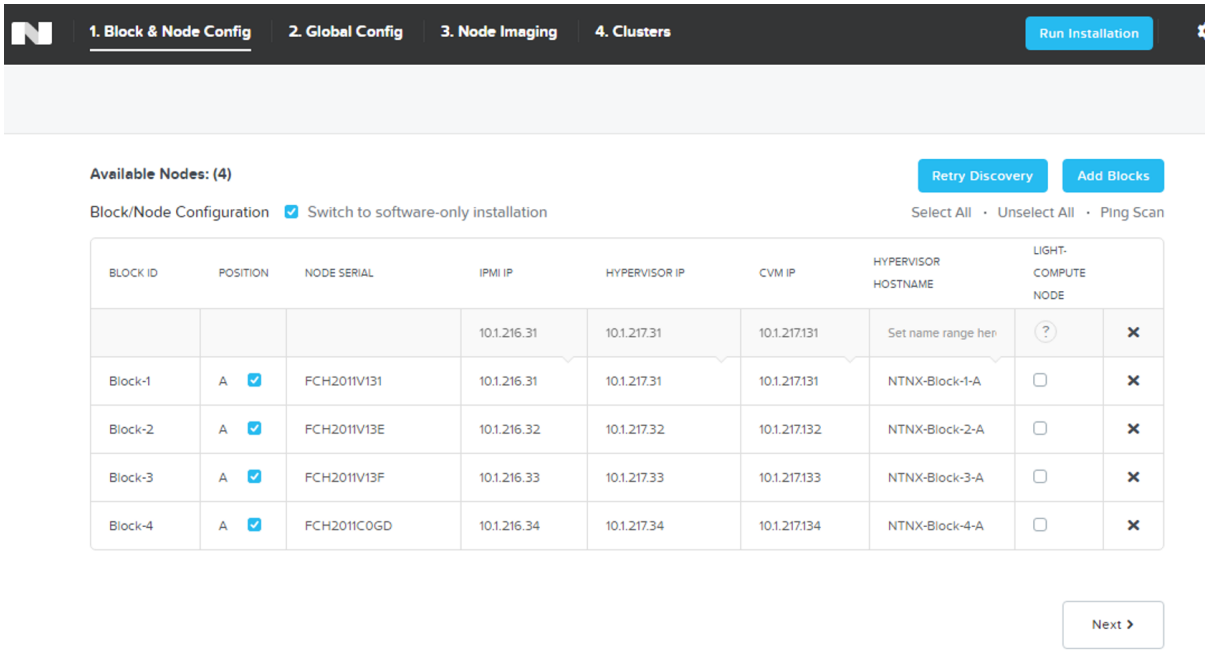

Figure: Details to Specify on the Block & Node Config Page

9. On the **Global Configuration** page, do the following:

   a. In the **IPMI**, **Hypervisor**, and **CVM** sections, specify appropriate values.

b. In the **Management Software** section, specify the IP address that you assigned to UCS Manager (that is, the IP address that you assigned to the management port on the fabric interconnect) and the UCS Manager credentials, and then click **Next**.

10. On the **Image Selection** page, select the Acropolis and hypervisor packages with which you want to image the servers, and then click **Next**.
11. If you want to create a cluster during the imaging process, click Create New Cluster, select the servers that you want to include in the cluster.
12. Click **Run Installation**.
    Foundation images the servers and configures UCS Manager by performing tasks such as creating a service template, creating a service profile for each server and assigning the profiles to the servers, setting the boot order, and so on.

Appendix A

Configuring High Availability in a UCS Domain Mode Deployment

You can configure a high availability UCS Domain mode deployment by adding an upstream L2 switch and an additional PCIe-based Cisco VIC 1225 to each C-Series server.

Before you begin: Perform all the steps described in *Setting Up Network Connections for UCS Domain Mode* on page 27.

To configure high availability in a UCS Domain mode deployment, do the following:

1. Connect each fabric interconnect to an additional upstream L2 switch.

   Make a note of which fabric interconnect ports are connected to the second L2 switch. You will need this information when designating fabric interconnect ports as uplink Ethernet ports in UCS Manager.

2. Place a PCIe-based Cisco VIC 1225 in the PCIe slot on each C-Series server and connect one port in the VIC to one fabric interconnect and the other port to the other fabric interconnect.

   Make a note of which fabric interconnect ports are connected to the C-Series servers. You will need this information when designating fabric interconnect ports as server ports in UCS Manager.

   The resulting network topology, assuming three C-Series servers, is as follows:

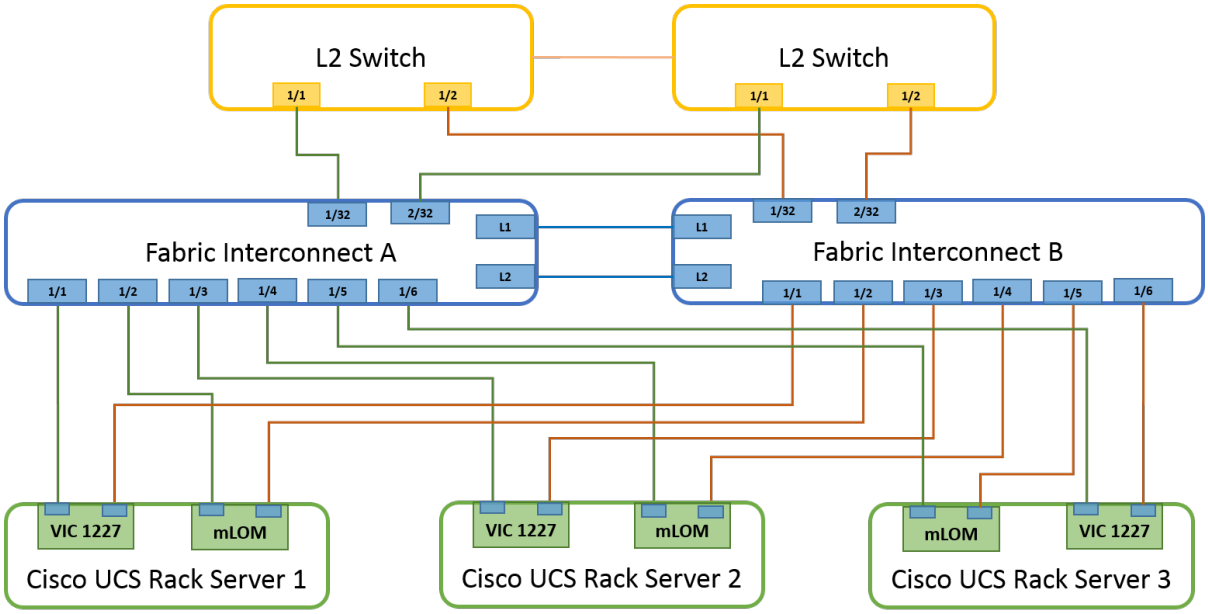

Figure: Network Topology with High Availability

Appendix B

Notes and Cautions

The release notes provide brief, high-level descriptions of notes and cautions for this release. Where applicable, the description includes a solution or workaround.

- Use firmware version 11.00.06.00 for the Cisco 12 Gbps Modular SAS HBA. Otherwise, the C240 series servers might experience lower random and sequential write performance. Contact Cisco and upgrade the firmware to 11.00.06.00 as described in *Upgrading the Cisco 12 Gbps Modular SAS HBA Firmware* on page 16. [UCS-6, UCS-14]
- In a UCS Domain mode deployment, the Nutanix Prism web console does not display the configured Cisco Integrated Management Controller (CIMC) IP addresses in the IPMI IP address fields. The IPMI IP address fields are all set to an IP address of 0.0.0.0.

  Workaround. In UCS Domain mode, a CIMC IP address is configured in UCS Manager as an out-of-band management IP address. The ipmitool utility does not detect this IPMI IP address. To obtain the CIMC IP address of a server, in UCS Manager, do the following:

  1. In the Navigation pane, on the **Equipment** tab, expand **Equipment** > **Rack Mounts** > **Servers**, and click the server.
  2. In the Work pane, on the **Inventory** tab, click **CIMC**.
  3. In the Actions area, click **Outband IPv4** tab and obtain the CIMC IP address from that tab.

  [UCS-66]

- After Foundation images the servers and creates a cluster, the Prism web console displays a warning about a Controller VM reboot. The warning does not impact the functioning of the cluster and can be ignored.
- Sometimes, Foundation takes too long to discover nodes and does not provide you an option to stop the process of discovery.

  If the user interface does not display the block and node table within 1–2 minutes, you can stop discovery by selecting and then clearing **Switch to software-only installation**.

- When imaging a standalone mode C-Series server, Foundation terminates with a message that indicates that the IPMI configuration failed.

  Workaround. Ignore the failure and click **Image Nodes**. The imaging process should start successfully.