

Deploying the Ultra M Solution

Ultra M is a multi-product solution. Detailed instructions for installing each of these products is beyond the scope of this document. Instead, the sections that follow identify the specific, non-default parameters that must be configured through the installation and deployment of those products in order to deploy the entire solution.

- Deployment Workflow, on page 1
- Plan Your Deployment, on page 2
- Install and Cable the Hardware, on page 2
- Configure the Switches, on page 6
- Prepare the UCS C-Series Hardware, on page 6
- Deploy the Virtual Infrastructure Manager, on page 14
- Deploy the USP-Based VNF, on page 15

Deployment Workflow

Figure 1: Ultra M Deployment Workflow



Plan Your Deployment

Before deploying the Ultra M solution, it is very important to develop and plan your deployment.

Network Planning

Networking Overview provides a general overview and identifies basic requirements for networking the Ultra M solution.

With this background, use the tables in Network Definitions (Layer 2 and 3) to help plan the details of your network configuration.

Install and Cable the Hardware

This section describes the procedure to install all the components included in the Ultra M Solution.

Related Documentation

To ensure hardware components of the Ultra M solution are installed properly, refer to the installation guides for the respective hardware components.

- Catalyst 2960-XR Switch http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst2960xr/hardware/ installation/guide/b_c2960xr_hig.html
- Catalyst 3850 48T-S Switch http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst3850/hardware/ installation/guide/b_c3850_hig.html
- Nexus 93180-YC 48 Port http://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/hw/ n93180ycex_hig/guide/b_n93180ycex_nxos_mode_hardware_install_guide.html
- Nexus 9236C 36 Port http://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/hw/ n9236c hig/guide/b c9236c nxos mode hardware install guide.html
- UCS C240 M4SX Server http://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/c/hw/C240M4/ install/C240M4.html

Rack Layout

Hyper-converged Ultra M XS Single VNF Deployment

Table 1: Hyper-converged Ultra M XS Single VNF Deployment Rack Layout, on page 2 provides details for the recommended rack layout for the Hyper-converged Ultra M XS Single VNF deployment model.

Table 1: Hyper-converged Ultra M XS Single VNF Deployment Rack Layout

	Rack #1	Rack #2
RU-1	Empty	Empty

	Rack #1	Rack #2
RU-2	Spine EOR Switch A: Nexus 9236C	Spine EOR Switch B: Nexus 9236C
RU-3	Empty	Empty
RU-4	VNF Mgmt Switch: Catalyst C3850-48T-S OR C2960XR-48TD	Empty
RU-5	VNF Leaf TOR Switch A: Nexus 93180YC-EX	Empty
RU-6	VNF Leaf TOR Switch B: Nexus 93180YC-EX	Empty
RU-7/8	Ultra UEM 1A: UCS C240 M4 SFF	Empty
RU-9/10	Ultra UEM 1B: UCS C240 M4 SFF	Empty
RU-11/12	Empty	Empty
RU-13/14	Demux SF: UCS C240 M4 SFF	Empty
RU-15/16	Standby SF: UCS C240 M4 SFF	Empty
RU-17/18	Active SF 1: UCS C240 M4 SFF	Empty
RU-19/20	Active SF 2: UCS C240 M4 SFF	Empty
RU-21/22	Active SF 3: UCS C240 M4 SFF	Empty
RU-23/24	Active SF 4: UCS C240 M4 SFF	Empty
RU-25/26	Active SF 5: UCS C240 M4 SFF	Empty
RU-27/28	Active SF 6: UCS C240 M4 SFF	Empty
RU-29/30	Empty	Empty
RU-31/32	Empty	Empty
RU-33/34	Empty	Empty
RU-35/36	Ultra UEM 1C	OpenStack Control C: UCS C240 M4 SFF
RU-37/38	Ultra M Manager: UCS C240 M4 SFF	Empty
RU-39/40	OpenStack Control A: UCS C240 M4 SFF	OpenStack Control B: UCS C240 M4 SFF
RU-41/42	Empty	Empty
Cables	Controller Rack Cables	Controller Rack Cables
Cables	Spine Uplink/Interconnect Cables	Spine Uplink/Interconnect Cables

	Rack #1	Rack #2
Cables	Leaf TOR To Spine Uplink Cables	Empty
Cables	VNF Rack Cables	Empty

Hyper-converged Ultra M XS Multi-VNF Deployment

Table 2: Hyper-converged Ultra M XS Multi-VNF Deployment Rack Layout, on page 4 provides details for the recommended rack layout for the Hyper-converged Ultra M XS Multi-VNF deployment model.

Table 2: Hyper-converged Ultra M XS Multi-VNF Deployment Rack Layout

	Rack #1	Rack #2	Rack #3	Rack #4
RU-1	Empty	Empty	Empty	Empty
RU-2	Spine EOR Switch A: Nexus 9236C	Spine EOR Switch B: Nexus 9236C	Empty	Empty
RU-3	Empty	Empty	Empty	Empty
RU-4	VNF Mgmt Switch:	VNF Mgmt Switch:	VNF Mgmt Switch:	VNF Mgmt Switch:
	Catalyst	Catalyst	Catalyst	Catalyst
	C3850-48T-S OR	C3850-48T-S OR	C3850-48T-S OR	C3850-48T-S OR
	C2960XR-48TD	C2960XR-48TD	C2960XR-48TD	C2960XR-48TD
RU-5	VNF Leaf TOR	VNF Leaf TOR	VNF Leaf TOR	VNF Leaf TOR
	Switch A: Nexus	Switch A: Nexus	Switch A: Nexus	Switch A: Nexus
	93180YC-EX	93180YC-EX	93180YC-EX	93180YC-EX
RU-6	VNF Leaf TOR	VNF Leaf TOR	VNF Leaf TOR	VNF Leaf TOR
	Switch B: Nexus	Switch B: Nexus	Switch B: Nexus	Switch B: Nexus
	93180YC-EX	93180YC-EX	93180YC-EX	93180YC-EX
RU-7/8	Ultra UEM 1A: UCS	Ultra UEM 2A: UCS	Ultra UEM 3A: UCS	Ultra UEM 4A:
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	UCS C240 M4 SFF
RU-9/10	Ultra UEM 1B: UCS	Ultra UEM 2B: UCS	Ultra UEM 3B: UCS	Ultra UEM 4B: UCS
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF
RU-11/12	Empty	Empty	Empty	Empty
RU-13/14	Demux SF: UCS	Demux SF: UCS	Demux SF: UCS	Demux SF: UCS
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF
RU-15/16	Standby SF: UCS	Standby SF: UCS	Standby SF: UCS	Standby SF: UCS
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF
RU-17/18	Active SF 1: UCS	Active SF 1: UCS	Active SF 1: UCS	Active SF 1: UCS
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF
RU-19/20	Active SF 2: UCS	Active SF 2: UCS	Active SF 2: UCS	Active SF 2: UCS
	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF	C240 M4 SFF

	Rack #1	Rack #2	Rack #3	Rack #4
RU-21/22	Active SF 3: UCS C240 M4 SFF	Active SF 3: UCS C240 M4 SFF	Active SF 3: UCS C240 M4 SFF	Active SF 3: UCS C240 M4 SFF
RU-23/24	Active SF 4: UCS C240 M4 SFF	Active SF 4: UCS C240 M4 SFF	Active SF 4: UCS C240 M4 SFF	Active SF 4: UCS C240 M4 SFF
RU-25/26	Active SF 5: UCS C240 M4 SFF	Active SF 5: UCS C240 M4 SFF	Active SF 5: UCS C240 M4 SFF	Active SF 5: UCS C240 M4 SFF
RU-27/28	Active SF 6: UCS C240 M4 SFF	Active SF 6: UCS C240 M4 SFF	Active SF 6: UCS C240 M4 SFF	Active SF 6: UCS C240 M4 SFF
RU-29/30	Empty	Empty	Empty	Empty
RU-31/32	Empty	Empty	Empty	Empty
RU-33/34	Empty	Empty	Empty	Empty
RU-35/36	Ultra UEM 1C,2C,3C,4C	OpenStack Control C: UCS C240 M4 SFF	Empty	Empty
RU-37/38	Ultra M Manager: UCS C240 M4 SFF	Empty	Empty	Empty
RU-39/40	OpenStack Control A: UCS C240 M4 SFF	OpenStack Control B: UCS C240 M4 SFF	Empty	Empty
RU-41/42	Empty	Empty	Empty	Empty
Cables	Controller Rack Cables	Controller Rack Cables	Controller Rack Cables	Empty
Cables	Spine Uplink/Interconnect Cables	Spine Uplink/Interconnect Cables	Empty	Empty
Cables	Leaf TOR To Spine Uplink Cables	Leaf TOR To Spine Uplink Cables	Leaf TOR To Spine Uplink Cables	Leaf TOR To Spine Uplink Cables
Cables	VNF Rack Cables	VNF Rack Cables	VNF Rack Cables	VNF Rack Cables

Cable the Hardware

After the hardware has been installed, install all power and network cabling for the hardware using the information and instructions in the documentation for the specific hardware product. Refer to Related Documentation, on page 2 for links to the hardware product documentation. Ensure that you install your network cables according to your network plan.

Configure the Switches

All of the switches must be configured according to your planned network specifications.



Refer to Network Planning, on page 2 for information and consideration for planning your network.

Refer to the user documentation for each of the switches for configuration information and instructions:

- Catalyst C2960XR-48TD-I: http://www.cisco.com/c/en/us/support/switches/ catalyst-2960xr-48td-i-switch/model.html
- Catalyst 3850 48T-S: http://www.cisco.com/c/en/us/support/switches/catalyst-3850-48t-s-switch/ model.html
- Nexus 93180-YC-EX: http://www.cisco.com/c/en/us/support/switches/nexus-93180yc-fx-switch/ model.html
- Nexus 9236C: http://www.cisco.com/c/en/us/support/switches/nexus-9236c-switch/model.html

Prepare the UCS C-Series Hardware

UCS-C hardware preparation is performed through the Cisco Integrated Management Controller (CIMC). The tables in the following sections list the non-default parameters that must be configured per server type:

- Prepare the Staging Server/Ultra M Manager Node, on page 7
- Prepare the Controller Nodes, on page 7
- Prepare the Compute Nodes, on page 9
- Prepare the OSD Compute Nodes, on page 10

Refer to the UCS C-series product documentation for more information:

- UCS C-Series Hardware https://www.cisco.com/c/en/us/support/servers-unified-computing/ ucs-c240-m4-rack-server/model.html
- CIMC Software https://www.cisco.com/c/en/us/support/servers-unified-computing/ ucs-c-series-integrated-management-controller/tsd-products-support-series-home.html

C)

Important

Part of the UCS server preparation is the configuration of virtual drives. If there are virtual drives present which need to be deleted, select the Virtual Drive Info tab, select the virtual drive you wish to delete, then click Delete Virtual Drive. Refer to the CIMC documentation for more information.



Important

The information in this section assumes that the server hardware was properly installed per the information and instructions in Install and Cable the Hardware, on page 2.

Prepare the Staging Server/Ultra M Manager Node

Table 3: Staging Server/Ultra	M Manager Node Parameters
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Parameters and Settings	Description		
CIMC Utility Setup			
Enable IPV4	Configures parameters for the dedicated management port.		
Dedicated			
No redundancy			
IP address			
Subnet mask			
Gateway address			
DNS address			
Admin > User Management	Admin > User Management		
Username	Configures administrative user credentials for accessing the		
Password	CIMC utility.		
Admin > Communication Services			
IPMI over LAN Properties = Enabled	Enables the use of Intelligent Platform Management Interface capabilities over the management port.		
Server > BIOS > Configure BIOS > Advanced			
Intel(R) Hyper-Threading Technology = Disabled	Disable hyper-threading on server CPUs to optimize Ultra M system performance.		
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Info			
Status = Unconfigured Good	Ensures that the hardware is ready for use.		

Prepare the Controller Nodes

Table 4: Controller Node Parameters

Parameters and Settings	Description
CIMC Utility Setup	

I

Parameters and Settings	Description	
Enable IPV4	Configures parameters for the dedicated management port.	
Dedicated		
No redundancy		
IP address		
Subnet mask		
Gateway address		
DNS address		
Admin > User Management		
Username	Configures administrative user credentials for accessing the	
Password	CIMC utility.	
Admin > Communication Services		
IPMI over LAN Properties = Enabled	Enables the use of Intelligent Platform Management Interface capabilities over the management port.	
Admin > Communication Services		
IPMI over LAN Properties = Enabled	Enables the use of Intelligent Platform Management Interface capabilities over the management port.	
Server > BIOS > Configure BIOS > Adv	anced	
Intel(R) Hyper-Threading Technology = Disabled	Intel(R) Hyper-Threading Technology = Disabled	
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Info		
Status = Unconfigured Good	Ensures that the hardware is ready for use.	
Storage > Cisco 12G SAS Modular RAID Controller > Controller Info		
Virtual Drive Name = OS	Creates the virtual drives required for use by the operating system	
Read Policy = No Read Ahead	(OS).	
RAID Level = RAID 1		
Cache Policy: Direct IO		
Strip Size: 64KB		
Disk Cache Policy: Unchanged		
Access Policy: Read Write		
Size: 1143455 MB		
Write Policy: Write Through		

Parameters and Settings	Description
Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.

Prepare the Compute Nodes

Table 5: Compute Node Parameters

Parameters and Settings	Description	
CIMC Utility Setup		
Enable IPV4	Configures parameters for the dedicated management port.	
Dedicated		
No redundancy		
IP address		
Subnet mask		
Gateway address		
DNS address		
Admin > User Management		
Username	Configures administrative user credentials for accessing the CIMC	
Password	utility.	
Admin > Communication Services		
IPMI over LAN Properties = Enabled	Enables the use of Intelligent Platform Management Interface capabilities over the management port.	
Server > BIOS > Configure BIOS > Advanced		
Intel(R) Hyper-Threading Technology = Disabled	Intel(R) Hyper-Threading Technology = Disabled	
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Info		
Status = Unconfigured Good	Ensures that the hardware is ready for use.	
Storage > Cisco 12G SAS Modular RAID Controller > Controller Info		

Parameters and Settings	Description
Virtual Drive Name = BOOTOS	Creates the virtual drives required for use by the operating system
Read Policy = No Read Ahead	(OS).
RAID Level = RAID 1	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 1143455 MB	
Write Policy: Write Through	
Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, BOOTOS	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.
Set as Boot Drive	Sets the BOOTOS virtual drive as the system boot drive.

Prepare the OSD Compute Nodes

Note OSD Compute Nodes are only used in Hyper-converged Ultra M models as described in UCS C-Series Servers.

Parameters and Settings	Description
CIMC Utility Setup	
Enable IPV4	Configures parameters for the dedicated management port.
Dedicated	
No redundancy	
IP address	
Subnet mask	
Gateway address	
DNS address	
Admin > User Management	

Table 6: OSD Compute Node Parameters

Parameters and Settings	Description		
Username	Configures administrative user credentials for accessing the CIMC utility.		
Password			
Admin > Communication Servi	Admin > Communication Services		
IPMI over LAN Properties = Enabled	Enables the use of Intelligent Platform Management Interface capabilities over the management port.		
Server > BIOS > Configure BIOS > Advanced			
Intel(R) Hyper-Threading Technology = Disabled	Intel(R) Hyper-Threading Technology = Disabled		
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Info			
Status = Unconfigured Good	Ensures that the hardware is ready for use.		
SLOT-HBA Physical Drive Numbers =	Ensure the UCS slot host-bus adapter for the drives are configured accordingly.		
1			
2			
3			
7			
8			
9			
10			
Storage > Cisco 12G SAS Mode	ılar RAID Controller > Physical Drive Number = 1		
Virtual Drive Name = BOOTOS	Creates a virtual drive leveraging the storage space available to physical		
Read Policy = No Read Ahead	drive number 1.		
RAID Level = RAID 1	Note Ensure that the size of this virtual drive is less than the size of the designated journal and storage drives		
Cache Policy: Direct IO			
Strip Size: 64KB			
Disk Cache Policy: Unchanged			
Access Policy: Read Write			
Size: 285148 MB			
Write Policy: Write Through			
Storage > Cisco 12G SAS Mode	alar RAID Controller > Virtual Drive Info, BOOTOS, Physical Drive		

Number = 1

Parameters and Settings	Description	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.	
Set as Boot Drive	Sets the BOOTOS virtual drive as the system boot drive.	
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Number = 2		
Virtual Drive Name = BOOTOS	Creates a virtual drive leveraging the storage space available to physical drive number 2.	
Read Policy = No Read Ahead		
RAID Level = RAID 1	Note Ensure that the size of this virtual drive is less than the size of the designated journal and storage drives.	
Cache Policy: Direct IO		
Strip Size: 64KB		
Disk Cache Policy: Unchanged		
Access Policy: Read Write		
Size: 285148 MB		

Write Policy: Write Through

Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, BOOTOS, Physical Drive Number = 2

Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.	
Set as Boot Drive	Sets the BOOTOS virtual drive as the system boot drive.	
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Number = 3		
Virtual Drive Name =	Creates a virtual drive leveraging the storage space available to physical	

JOURNAL	drive number 3.
Read Policy = No Read Ahead	
RAID Level = RAID 0	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 456809 MB	
Write Policy: Write Through	

Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, JOURNAL, Physical Drive Number = 3

Parameters and Settings	Description
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.
Storage > Cisco 12G SAS Mode	ular RAID Controller > Physical Drive Number = 7
Virtual Drive Name = OSD1	Creates a virtual drive leveraging the storage space available to physical drive number 7.
Read Policy = No Read Ahead	
RAID Level = RAID 0	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 1143455 MB	
Write Policy: Write Through	
Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, OSD1, Physical Drive Number = 7	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.
Storage > Cisco 12G SAS Mode	ular RAID Controller > Physical Drive Number = 8
Virtual Drive Name = OSD2	Creates a virtual drive leveraging the storage space available to physical
Read Policy = No Read Ahead	drive number 8.
RAID Level = RAID 0	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 1143455 MB	
Write Policy: Write Through	
Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, OSD2, Physical Drive Number = 8	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.
Storage > Cisco 12G SAS Modular RAID Controller > Physical Drive Number = 9	

Parameters and Settings	Description
Virtual Drive Name = OSD3	Creates a virtual drive leveraging the storage space available to physical drive number 9.
Read Policy = No Read Ahead	
RAID Level = RAID 0	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 1143455 MB	
Write Policy: Write Through	
Storage > Cisco 12G SAS Mod Number = 9	ular RAID Controller > Virtual Drive Info, OSD3, Physical Drive
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.
Storage > Cisco 12G SAS Mod	ular RAID Controller > Physical Drive Number = 10
Virtual Drive Name = OSD4	Creates a virtual drive leveraging the storage space available to physical drive number 10.
Read Policy = No Read Ahead	
RAID Level = RAID 0	
Cache Policy: Direct IO	
Strip Size: 64KB	
Disk Cache Policy: Unchanged	
Access Policy: Read Write	
Size: 1143455 MB	
Write Policy: Write Through	
Storage > Cisco 12G SAS Modular RAID Controller > Virtual Drive Info, OSD4, Physical Drive Number = 10	
Initialize Type = Fast Initialize	Initializes this virtual drive. A fast initialization quickly writes zeroes to the first and last 10-MB regions of the new virtual drive and completes the initialization in the background.

Deploy the Virtual Infrastructure Manager

Within the Ultra M solution, OpenStack Platform Director (OSP-D) functions as the virtual infrastructure manager (VIM).

The method by which the VIM is deployed depends on the architecture of your Ultra M model. Refer to the following section for information related to your deployment scenario.

Deploy the VIM for Hyper-Converged Ultra M Models

Deploying the VIM for Hyper-Converged Ultra M Models is performed using an automated workflow enabled through software modules within Ultra Automation Services (UAS). These services leverage user-provided configuration information to automatically deploy the VIM Orchestrator (Undercloud) and the VIM (Overcloud).

For information on using this automated process, in the USP Deployment Automation Guide, refer to the Virtual Infrastructure Manager Installation Automation section.

Deploy the USP-Based VNF

After the OpenStack Undercloud (VIM Orchestrator) and Overcloud (VIM) have been successfully deployed on the Ultra M hardware, you must deploy the USP-based VNF.

This process is performed through the Ultra Automation Services (UAS). UAS is an automation framework consisting of a set of software modules used to automate the USP-based VNF deployment and related components such as the VNFM.

For detailed information on the automation workflow, refer to the *Ultra Service Platform Deployment Automation Guide*.

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