



# Hardware Specifications

Ultra M deployments use the following hardware:



**Note** The specific component software and firmware versions identified in the sections that follow have been validated in this Ultra M solution release.

- [Cisco Catalyst Switches, on page 1](#)
- [Cisco Nexus Switches, on page 2](#)
- [UCS C-Series Servers, on page 3](#)

## Cisco Catalyst Switches

Cisco Catalyst Switches provide as physical layer 1 switching for Ultra M components to the management and provisioning networks. One of two switch models is used based on the Ultra M model being deployed:

- [Catalyst C2960XR-48TD-I Switch, on page 1](#)
- [Catalyst 3850-48T-S Switch, on page 1](#)

### Catalyst C2960XR-48TD-I Switch

The Catalyst C2960XR-48TD-I has 48 10/100/1000 ports.

*Table 1: Catalyst 2960-XR Switch Information*

Ultra M Model(s)	Quantity	Software Version	Firmware Version
Ultra M XS Single VNF	2	IOS 15.2.(2) E5	Boot Loader: 15.2(3r)E1
Ultra M XS Multi-VNF	1 per rack	IOS 15.2.(2) E5	Boot Loader: 15.2(3r)E1

### Catalyst 3850-48T-S Switch

The Catalyst 3850 48T-S has 48 10/100/1000 ports.

**Table 2: Catalyst 3850-48T-S Switch Information**

Ultra M Models	Quantity	Software Version	Firmware Version
Ultra M XS Single VNF	2	IOS: 03.06.06E	Boot Loader: 3.58
Ultra M XS Multi-VNF	1 per Rack	IOS: 03.06.06E	Boot Loader: 3.58

## Cisco Nexus Switches

Cisco Nexus Switches serve as top-of-rack (TOR) leaf and end-of-rack (EOR) spine switches provide out-of-band (OOB) network connectivity between Ultra M components. Two switch models are used for the various Ultra M models:

- [Nexus 93180-YC-EX, on page 2](#)
- [Nexus 9236C , on page 2](#)
- [Nexus 9364C, on page 3](#)

### Nexus 93180-YC-EX

Nexus 93180 switches serve as network leaves within the Ultra M solution. Each switch has 48 10/25-Gbps Small Form Pluggable Plus (SFP+) ports and 6 40/100-Gbps Quad SFP+ (QSFP+) uplink ports.

**Table 3: Nexus 93180-YC-EX**

Ultra M Model(s)	Quantity	Software Version	Firmware Version
Ultra M XS Single VNF	2	NX-OS: 7.0(3)I7(3)	BIOS: 7.59
Ultra M XS Multi-VNF	2 per Rack	NX-OS: 7.0(3)I7(3)	BIOS: 7.59

### Nexus 9236C

Nexus 9236 switches serve as network spines within the Ultra M solution. Each switch provides 36 10/25/40/50/100 Gbps ports.

The following table provides the Nexus switch recommendation for both Ultra M B1.0 and B1.1 models.

Table 4: Nexus 9236C

Ultra M Model(s)	Quantity	Software Version	Firmware Version
Ultra M XS Single VNF	2	For Ultra M B1.0 model — NX-OS: 7.0(3)I7(3)  For Ultra M B1.1 model — NX-OS: 7.0(3)I7(4)	For Ultra M B1.0 model — BIOS: 7.59  For Ultra M B1.1 model — BIOS: 7.61
Ultra M XS Multi-VNF	2	For Ultra M B1.0 model — NX-OS: 7.0(3)I7(3)  For Ultra M B1.1 model — NX-OS: 7.0(3)I7(4)	For Ultra M B1.0 model — BIOS: 7.59  For Ultra M B1.1 model — BIOS: 7.61

## Nexus 9364C

Nexus 9364 switches serve as network leaf within the Ultra M solution. Each switch provides 64 40-/100-Gigabit QSFP28 interface ports.

The following table provides the Nexus switch recommendation for the Ultra M B1.1 model.

Table 5: Nexus 9364C

Ultra M Model(s)	Quantity	Software Version	Firmware Version
Ultra M XS Single VNF	2	NX-OS: 7.0(3)I7(4)	BIOS: 5.28
Ultra M XS Multi-VNF	2	NX-OS: 7.0(3)I7(4)	BIOS: 5.28

## UCS C-Series Servers

Cisco UCS C240 M4S SFF servers and UCS C220 M5S servers host the functions and virtual machines (VMs) required by Ultra M.



### Important

Note that both the M4 and M5 UCS servers cannot be used in the same PoD, and cannot be replaced with each other.

## Server Functions and Quantities

Server functions and quantity differ depending on the Ultra M model you are deploying:

- **Ultra M Manager Node:** Required only for Ultra M models based on the Hyper-Converged architecture, this server hosts the following:
  - AutoIT HA VMs
  - AutoDeploy HA VMs

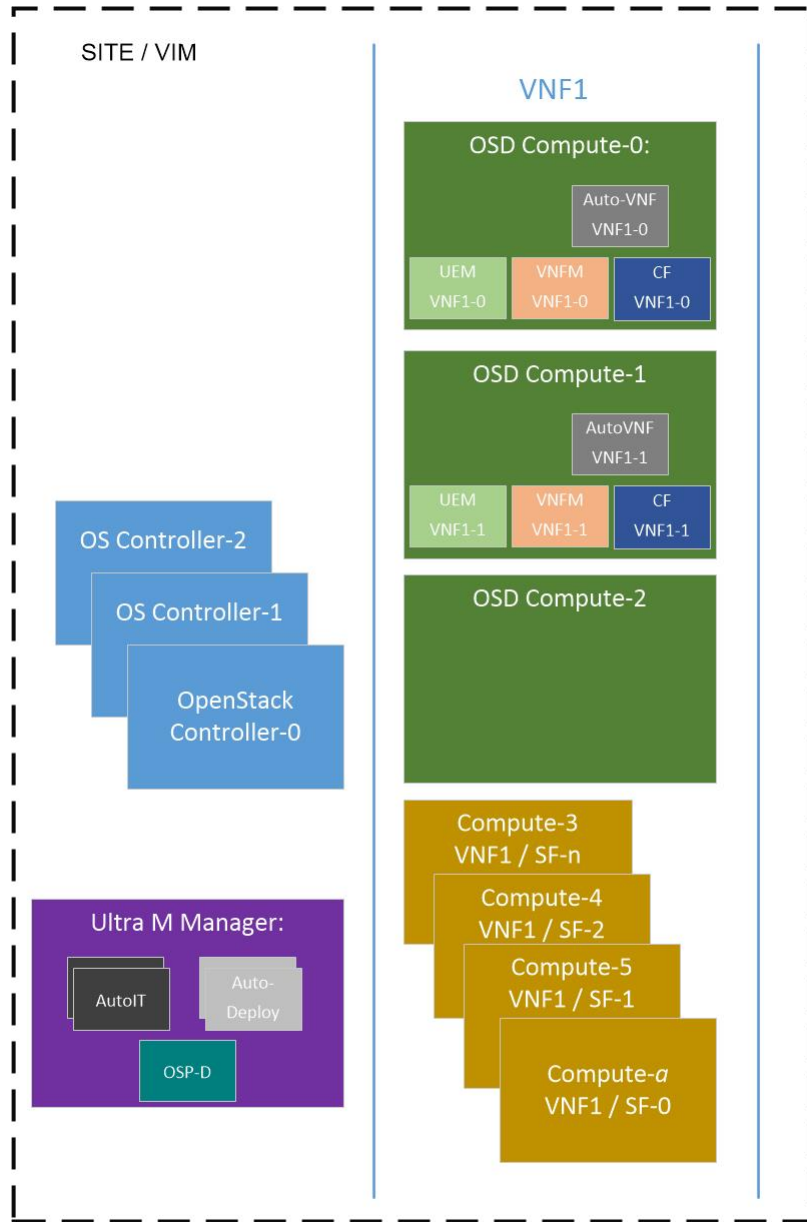
- OSP-D VM
- **OpenStack Controller Nodes:** These servers host the high availability (HA) cluster that serves as the VIM within the Ultra M solution. In addition, they facilitate the Ceph storage monitor function required by the Ceph Storage Nodes and/or OSD Compute Nodes.
- **OSD Compute Nodes:** Required only for Hyper-converged Ultra M models, these servers provide Ceph storage functionality in addition to hosting VMs for the following:
  - AutoVNF HA VMs
  - Elastic Services Controller (ESC) Virtual Network Function Manager (VNFM) active and standby VMs
  - Ultra Element Manager (UEM) VM HA cluster
  - Ultra Service Platform (USP) Control Function (CF) active and standby VMs
- **Compute Nodes:** For all Ultra M models, these servers host the active, standby, and demux USP Service Function (SF) VMs.

**Table 6: Ultra M Server Quantities by Model and Function**

Ultra M Model(s)	Server Quantity (max)	Ultra M Manager Node	Controller Nodes	OSD Compute Nodes	Compute Nodes (max)	Additional Specifications
Ultra M XS Single VNF	14	1	3	3	7	Based on node type as described in <a href="#">Table 7: Hyper-Converged Ultra M Single and Multi-VNF UCS C240 M4 Server Specifications by Node Type, on page 6.</a>
Ultra M XS Multi-VNF	45	1	3	3	38*	Based on node type as described in <a href="#">Table 7: Hyper-Converged Ultra M Single and Multi-VNF UCS C240 M4 Server Specifications by Node Type, on page 6.</a>
* Supports a maximum of 4 VNFs – 8 for the first VNF, 10 for each subsequent VNF.						

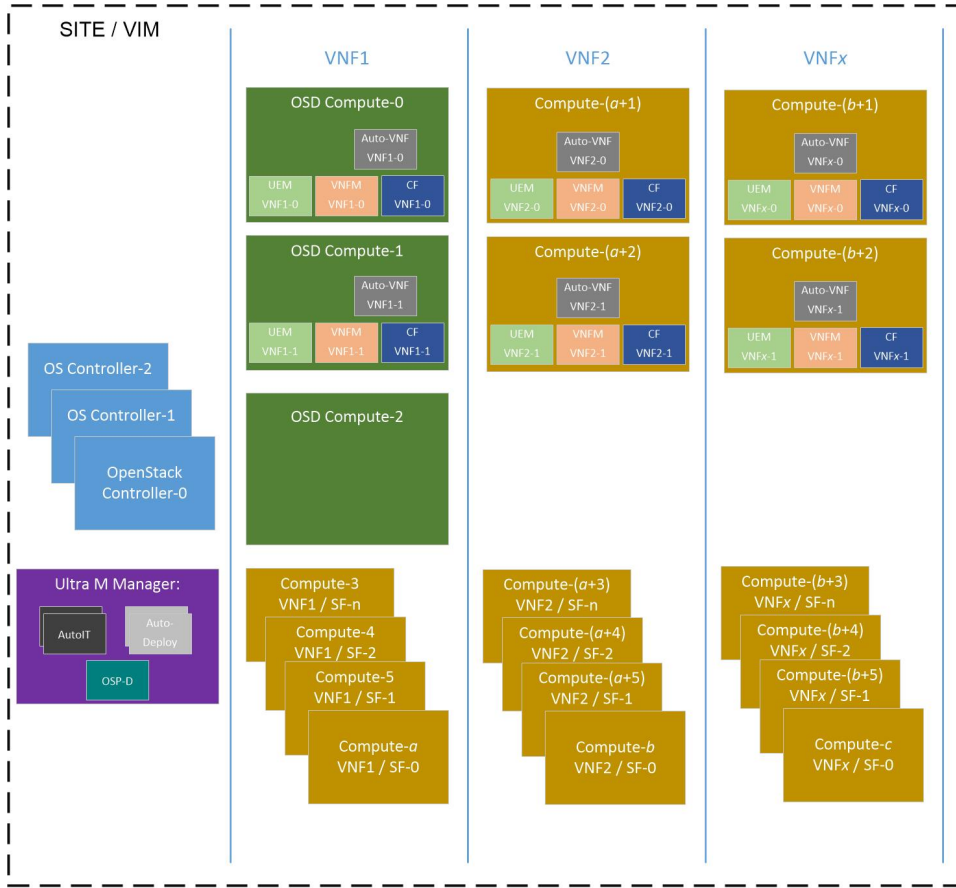
# VM Deployment per Node Type

Figure 1: VM Distribution on Server Nodes for Hyper-converged Ultra M Single VNF Models



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Figure 2: VM Distribution on Server Nodes for Hyper-converged Ultra M Multi-VNF Models



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## Server Configurations

Table 7: Hyper-Converged Ultra M Single and Multi-VNF UCS C240 M4 Server Specifications by Node Type

Node Type	CPU	RAM	Storage	Software Version	Firmware Version
Ultra M Manager Node*	2x 2.60 GHz	4x 32GB DDR4-2400-MHz RDIMM/PC4	2x 1.2 TB 12G SAS HDD	MLOM: 4.1(3f)	CIMC: 3.0(4d) System BIOS: C240M4.3.0.4a.0.0226182314
Controller	2x 2.60 GHz	4x 32GB DDR4-2400-MHz RDIMM/PC4	2x 1.2 TB 12G SAS HDD	MLOM: 4.1(3f)	CIMC: 3.0(4d) System BIOS: C240M4.3.0.4a.0.0226182314
Compute	2x 2.60 GHz	8x 32GB DDR4-2400-MHz RDIMM/PC4	2x 1.2 TB 12G SAS HDD	MLOM: 4.1(3f)	CIMC: 3.0(4d) System BIOS: C240M4.3.0.4a.0.0226182314

Node Type	CPU	RAM	Storage	Software Version	Firmware Version
OSD Compute	2x 2.60 GHz	8x 32GB DDR4-2400-MHz RDIMM/PC4	4x 1.2 TB 12G SAS HDD  2x 300G 12G SAS HDD HDD  1x 480G 6G SAS SATA SSD	MLOM: 4.1(3f)	CIMC: 3.0(4d)  System BIOS: C240M4.3.0.4a.0.0226182314
* OSP-D is deployed as a VM on the Ultra M Manager Node for Hyper-Converged Ultra M model(s).					

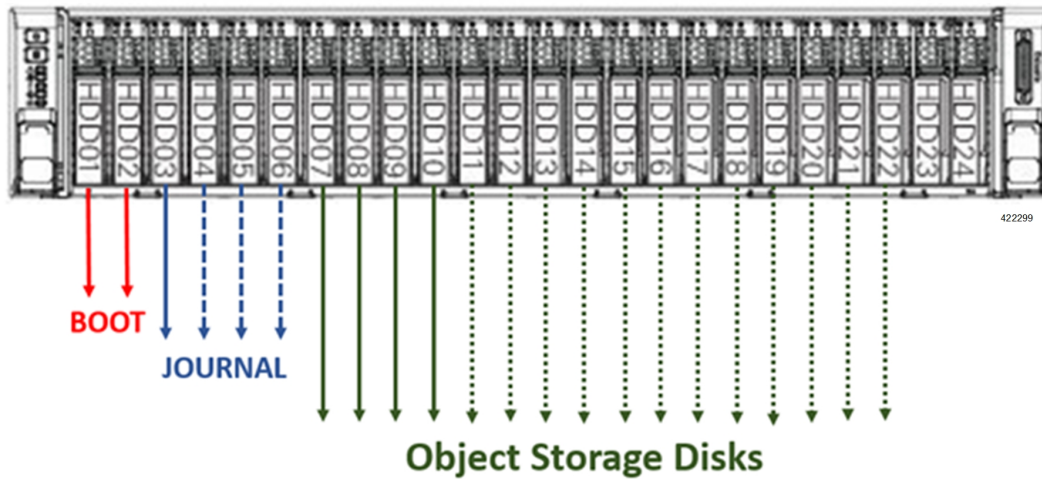
**Table 8: UCS C220 M5 Server Specifications by Node Type**

Node Type	CPU	RAM	Storage	Software Version	Firmware Version
OSPD Controller Compute	2x 6148 (2.4 GHz 20C)	384 GB RAM	2x 800GB SSD as RAID 1 VD	MLOM: UCS VIC 1387: 4.3(2a)	CIMC: 4.0(2d)  System BIOS: C220M5.4.0.2a.0.1102180244
HCI Compute	2x 6148 (2.4 GHz 20C)	384 GB RAM	2x 800GB SSD as RAID 1 VD  4x 800GB SSD as RAID 0 VD	MLOM: UCS VIC 1387: 4.3(2a)	CIMC: 4.0(2d)  System BIOS: C220M5.4.0.2a.0.1102180244

## Storage

Figure 3: UCS C240 Front-Plane, on page 8 displays the storage disk layout for the UCS C240 series servers used in the Ultra M solution.

Figure 3: UCS C240 Front-Plane



**NOTES:**

- The Boot disks contain the operating system (OS) image with which to boot the server.
- The Journal disks contain the Ceph journal file(s) used to repair any inconsistencies that may occur in the Object Storage Disks.
- The Object Storage Disks store object data for USP-based VNFs.
- Ensure that the HDD and SSD used for the Boot Disk, Journal Disk, and object storage devices (OSDs) are available as per the Ultra M BoM and installed in the appropriate slots as identified in [Table 9: UCS C240 M4S SFF Storage Specifications by Node Type, on page 8](#) and [Table 10: UCS C220 M5 Storage Specifications by Node Type, on page 9](#).

Table 9: UCS C240 M4S SFF Storage Specifications by Node Type

Ultra M Manager Node and Staging Server	2 x 1.2 TB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2
Controllers, Computes	2 x 1.2 TB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2
OSD Computes	2 x 300 GB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2 1 x 480 GB SSD – For Journal Disk as Virtual Drive in RAID0 – Slot 3 (Reserve for SSD Slot 3, 4, 5, 6 future scaling needs) 4 x 1.2 TB HDD – For OSD’s configured as Virtual Drive in RAID0 each – Slot 7, 8, 9, 10 (Reserve for OSD 7, 8, 9, 10....., 24)

Figure 4: UCS C220 Front-Plane, on page 9 displays the storage disk layout for the UCS C220 series servers used in the Ultra M solution.



Figure 4: UCS C220 Front-Plane

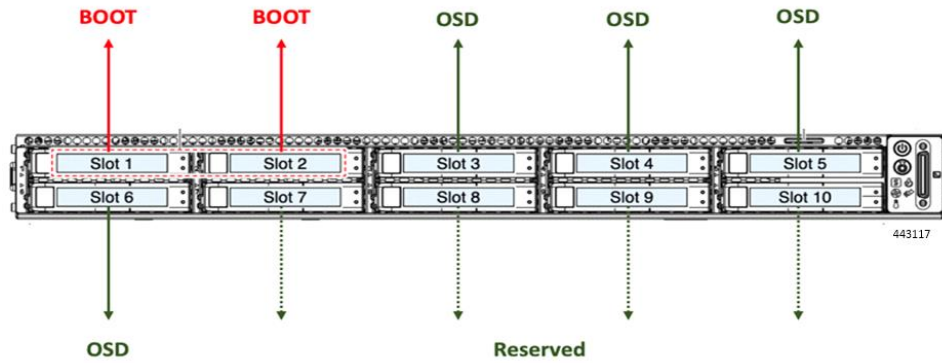


Table 10: UCS C220 M5 Storage Specifications by Node Type

Ultra M Manager Node and Staging Server	2 x 1.2 TB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2
Controllers, Computes	2 x 1.2 TB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2
OSD Computes	2 x 1.2 TB HDD – For Boot OS configured as Virtual Drive in RAID1 – placed on Slots 1 & 2 4 x 1.2 TB HDD – For OSD’s configured as Virtual Drive in RAID0 each – Slot 3, 4, 5, 6

- Ensure that the RAID sizes are sized such that:  
**Boot Disks < Journal Disk(s) < OSDs**
- Ensure that FlexFlash is disabled on each UCS-C240 M4 (factory default) or UCS C220 M5.
- Ensure that all nodes are in *Unconfigured Good* state under **Cisco SAS RAID Controllers** (factory default).

