

# Hitachi Content Platform

9.0

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## Installing an HCP SAIN System On-Site Final Setup

This book is the final on-site setup guide for single-rack Hitachi Content Platform systems that run on a SAN-attached array of independent nodes. It provides all the information you need to deploy an assembled and configured HCP SAIN system at your site. Additionally, it explains how to configure Hitachi Remote Ops to monitor the nodes in the HCP system.

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# Preface

This book is the final on-site setup guide for single-rack **Hitachi Content Platform (HCP)** systems that run on a SAN-attached array of independent nodes (**SAIN**). It provides all the information you need to deploy an assembled and configured HCP SAIN system at your site. Additionally, it explains how to configure Hitachi Remote Ops to monitor the nodes in the HCP system.



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**Important:** The information in this book is applicable to the HCP G11 server. For information about the HCP G10 server, see version **8.2** of this book.

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## Intended audience

This book is intended for the people at a customer site who are responsible for the on-site setup of an HCP SAIN system. It assumes you have experience working with computer hardware, as well as a basic understanding of HCP systems.

## Product version

This book applies to release 9.0 or later of HCP.

## Release notes

Read the release notes before installing and using this product. They may contain requirements or restrictions that are not fully described in this document or updates or corrections to this document. Release notes are available on Hitachi Vantara Support Connect:

<https://knowledge.hitachivantara.com/Documents>

## Related documents

The following documents contain additional information about Hitachi Content Platform:

- *HCP System Management Help* — This Help system is a comprehensive guide to administering and using an HCP system. The Help contains complete instructions for configuring, managing, and maintaining HCP system-level and tenant-level features and functionality. The Help also describes the properties of objects stored in HCP namespaces and explains how to access those objects.
- *HCP Tenant Management Help* — This Help system contains complete instructions for configuring, managing, and maintaining HCP namespaces. The Help also describes the properties of objects stored in HCP namespaces and explains how to access those objects.
- *Managing the Default Tenant and Namespace* — This book contains complete information for managing the default tenant and namespace in an HCP system. The book provides instructions for changing tenant and namespace settings, configuring the protocols that allow access to the namespace, managing search and indexing, and downloading the installation files for HCP Data Migrator. The book also explains how to work with retention classes and the privileged delete functionality.
- *Using the Default Namespace* — This book describes the file system HCP uses to present the contents of the default namespace. This book provides instructions for using HCP-supported protocols to store, retrieve, and deleting objects, as well as changing object metadata such as retention and shred settings.
- *Using HCP Data Migrator* — This book contains the information you need to install and use HCP Data Migrator (HCP-DM), a utility that works with HCP. This utility enables you to copy data between local file systems, namespaces in HCP, and earlier HCAP archives. It also supports bulk delete operations and bulk operations to change object metadata. Additionally, it supports associating custom metadata and ACLs with individual objects. The book describes both the interactive window-based interface and the set of command-line tools included in HCP-DM.
- *Installing an HCP System* — This book provides the information you need to install the software for a new HCP system. It explains what you

need to know to successfully configure the system and contains step-by-step instructions for the installation procedure.

- *Deploying an HCP-VM System on ESXi* — This book contains all the information you need to install and configure an HCP-VM system. The book also includes requirements and guidelines for configuring the VMWare® environment in which the system is installed.
- *Deploying an HCP-VM System on KVM* — This book contains all the information you need to install and configure an HCP-VM system. The book also includes requirements and guidelines for configuring the KVM environment in which the system is installed.
- *Third-Party Licenses and Copyrights* — This book contains copyright and license information for third-party software distributed with or embedded in HCP.
- *HCP-DM Third-Party Licenses and Copyrights* — This book contains copyright and license information for third-party software distributed with or embedded in HCP Data Migrator.
- *Installing an HCP RAIN System - Final On-site Setup* — This book contains instructions for deploying an assembled and configured HCP RAIN system at a customer site. It explains how to make the necessary physical connections and reconfigure the system for the customer computing environment. The book also provides instructions for assembling the components of an HCP RAIN system that was ordered without a rack and for configuring Hitachi Remote Ops to monitor the nodes in an HCP system.

## Accessing product documentation

Product documentation is available on Hitachi Vantara Support Connect: <https://knowledge.hitachivantara.com/Documents>. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

## Getting help

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**Note:** If you purchased your HCP G11 Node from a third party, please contact your authorized service provider.

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## Comments

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**Thank you!**



# HCP SAIN system overview

**Hitachi Content Platform (HCP)** is the distributed, fixed-content, data storage system from Hitachi Vantara. An HCP system consists of both hardware and software.

An SAIN system, also referred to for this current generation of hardware as an HCP G11 with Attached Storage, is delivered to a customer site as either a racked appliance or unracked components. In either case, all the components are preconfigured, and the HCP software is already installed. However, once the system is delivered and, for unracked components, assembled, it needs some final on-site setup.

This chapter contains:

- An introduction to HCP
- A description of the hardware architecture of HCP SAIN systems
- An overview of the final setup activities required to make your G11 with Attached Storage operational at your site



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**Note:** In this book, a system that delivered in a rack is referred to as **preassembled system**. A system that delivered without a rack is referred to as a **rackless system**, even though, when assembled, it includes a rack.

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## Introduction to Hitachi Content Platform

HCP is a combination of hardware and software that provides an object-based data storage environment. An HCP repository stores all types of data, from simple text files to medical images to multigigabyte database images.

HCP provides easy access to the repository for adding, retrieving, and, when allowed, deleting the stored data. HCP uses write-one, read-many (WORM) storage technology and a variety of policies and internal processes to ensure the integrity of the stored data and the efficient use of storage capacity.

### **HCP nodes**

An HCP system includes multiple servers, called **nodes**, that are networked together. Nodes are the essential part of an HCP system. They manage the data that resides in the system storage.

Each node runs the complete HCP software. HCP runtime operations are distributed among the nodes. If a node fails, the system adapts by redirecting processing to other nodes.

### **RAIN and SAIN systems**

Hitachi Vantara offers three HCP products: HCP G11 with Local Storage, HCP G11 with Attached Storage, and HCP-VM:

- HCP G11 with Local Storage systems run on a redundant array of independent nodes (RAIN) and use storage that's internal to those nodes.
- HCP G11 with Attached Storage systems run on a SAN-attached array of independent nodes (SAIN) and use storage in Fibre Channel SAN arrays. SAN stands for storage area network.

To optimize performance for certain usage patterns, nodes in an HCP G11 with Attached Storage system can have internal storage in addition to being connected to SAN storage.

- HCP-VM systems run on virtual machines in a VMware® environment.

HCP SAIN systems support larger repositories than HCP RAIN systems.

### **HCP System Management Console**

HCP includes a web application called the **System Management Console**. Your HCP system administrator uses this Console to configure, monitor, and manage the system. The Console reports certain hardware problems as they occur, so the system administrator can take appropriate action to initiate repairs.

## HCP SAIN system hardware

HCP SAIN system hardware consists of:

- Nodes with external storage (a typical starter system has four nodes). The nodes are numbered from 101 through 104 for a four-node system. The node numbers increase by one for each additional node.

The nodes in an HCP SAIN system are Hitachi Advanced Server DS220 servers.

- HCP S Series Nodes. The possible node models are:
  - S11
  - S31
- One or more SAN-attached storage arrays (a typical starter system has one array). Each storage array has one controller tray and one or more expansion trays. Arrays are not always included with the delivered HCP SAIN system. You may need to supply them yourself.

Storage can be running storage or spindown storage. Running storage is storage on continuously spinning disks. Spindown storage is storage on disks that can be spun down and spun up as needed. All systems have running storage. Only some systems have spindown storage.

- Ethernet switches and cables for networking. The switches in an HCP G11 with Attached Storage can be for one or ten gigabyte back-end network configurations. The possible switch models are:
  - Supported one gigabyte switches:
    - Brocade ICX 6430
  - Supported ten gigabyte switches:
    - Extreme 210
    - Brocade VDX 6740
    - Cisco Nexus 5548UP
    - Cisco Nexus 5596UP
    - Cisco Nexus C31108

- Cisco Nexus C31128
- Fibre Channel cables that connect the nodes to the storage arrays (Some systems use Fibre Channel switches to connect nodes and the storage arrays). The possible Fibre Channel switch models are:
  - Brocade 6510
  - Cisco MDS 9148S
- Additional infrastructure items such as a rack and power distribution units (PDUs).

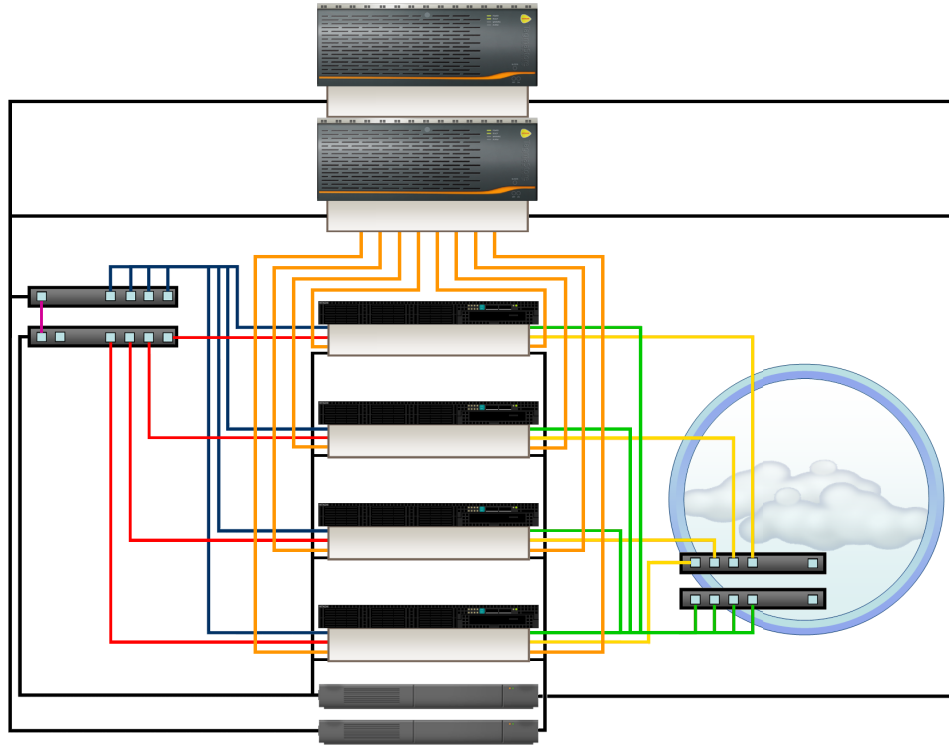
An HCP system uses a back-end network, front-end network, and, in certain configurations, a management network. The isolated back-end network connects the HCP nodes to each other through one or two Ethernet switches, depending on your network configuration and switch model. Each node has a pair of bonded Ethernet ports for connecting to these switches. Node port locations vary, depending on the network configuration the node was constructed for.

Each node is configured with an additional pair of bonded Ethernet ports that allows external applications to access the system. The recommended setup includes either two independent Ethernet switches that connect these ports to the front-end network (that is, your corporate network) or one Ethernet switch with both HCP and the switch configured for active-active bonding.

The front-end network switches and the cables for connecting them to the HCP nodes are not included with the delivered HCP SAIN system. The cables are customer supplied. You can use any supported HCP switches for the Front-end network.

Each node also has an additional management network Ethernet port that allows for the creation of the management network. The management network segregates system and tenant administration, management API, SNMP , syslog, outgoing SMTP, and SSH traffic from the [hcp\_system] network.

The figure below shows the standard architecture of an HCP SAIN system. This system has four nodes, a Fibre Channel SAN array that consists of one controller tray and one expansion tray, two back-end switches (on the left), and two front-end switches (on the right).



The table below describes the cables in this figure.

Cable	Connects from	Connects to
Red and blue Ethernet	Back-end network interface cards (NICs) in each node	Back-end switches
Green and yellow Ethernet	Front-end NICs in each node	Front-end switches
Purple Ethernet	Back-end switches	Each other
Orange Fibre Channel	Each node	SAN array
Black power	Each node	Two PDUs
	Each back-end switch	One PDU
	Tray in the SAN-attached storage array	Two PDUs

## Final on-site setup activities

An HCP SAIN system arrives with the HCP software already installed and configured with various default settings.

To get the system up and running, you perform the activities outlined in the table below.

Step	Activity	More information
1	Verify that your site is ready for the HCP system to be installed.	<a href="#">Chapter 2: "Site preparation"</a> on page 19
2	For a preassembled system, remove the racked HCP system from the packing crate and position it in your data center.	N/A
	For a rackless system, assemble the HCP system components in a rack that you supply.	<a href="#">Chapter 3: "Assembling rackless components"</a> on page 39
3	Connect the HCP PDUs to your power sources.	<a href="#">"Connecting to the power sources"</a> on page 137
4	Reconfigure the HCP system for your environment.	<a href="#">Chapter 5: "Reconfiguring the HCP system for your site"</a> on page 141
5	Connect the HCP system to your corporate network. <b>Note:</b> If the preconfigured front-end IP addresses do not work for your environment, perform step 6 below before performing this step.	<a href="#">"Connecting to your corporate network"</a> on page 138
6	Configure the HCP system as a subdomain in the DNS. Be sure to use your site-specific node IP addresses and not the default IP addresses the system arrives with.  If you don't use DNS at your site, skip this step.	<i>Administering HCP</i>
7	Optionally, configure Hitachi Remote Ops to monitor the HCP nodes.	<a href="#">Chapter 6: "Configuring HCP monitoring with Hitachi Remote Ops"</a> on page 157

## Site preparation

Before an HCP SAIN system can be deployed, you need to ensure that the intended location for the system meets certain environmental requirements. If the location does not already meet these requirements, you should wait to deploy the system until the necessary changes have been made.

You also need to have on hand the additional components that enable you to complete the connections between the HCP system and your environment.

This chapter describes the conditions and components required for the successful installation and operation of an HCP SAIN system.

### Server specifications

An HCP G11 with Attached Storage Node consist of the following components:

- 2U enclosure with mounting rail kit
- 2 hot-swappable power supplies
- 2 IEC C13/C14 power cords
- 6 replaceable cooling fans
- 1 motherboard with four Intel 10L BASE-T ports and BMC with 1G BASE-T port
- 1 airflow baffle
- 3 PCIe riser cards

- 2 Intel Silver 4210 CPUs with heat sinks
- 2-16 32GB DIMMs (64GB-512GB)
- 1 Broadcom SAS 3516 RAID mezzanine card
- 1 Broadcom CacheVault module
- 1 SAS 2.5" drive cage
- 1 Emulex LPe12002 8G FC HBA card

Conditionally, the server may contain one or more of the following items depending on the Ethernet networking and SSD options chosen:

- 1 Intel X540 dual-port PCI 10G BASE-T Ethernet card
- 1 or 2 Intel X520 dual-port PCI 10G SFP+ Ethernet cards
- 2 1.9TB 2.5" enterprise SATA SSDs

## Mechanical details

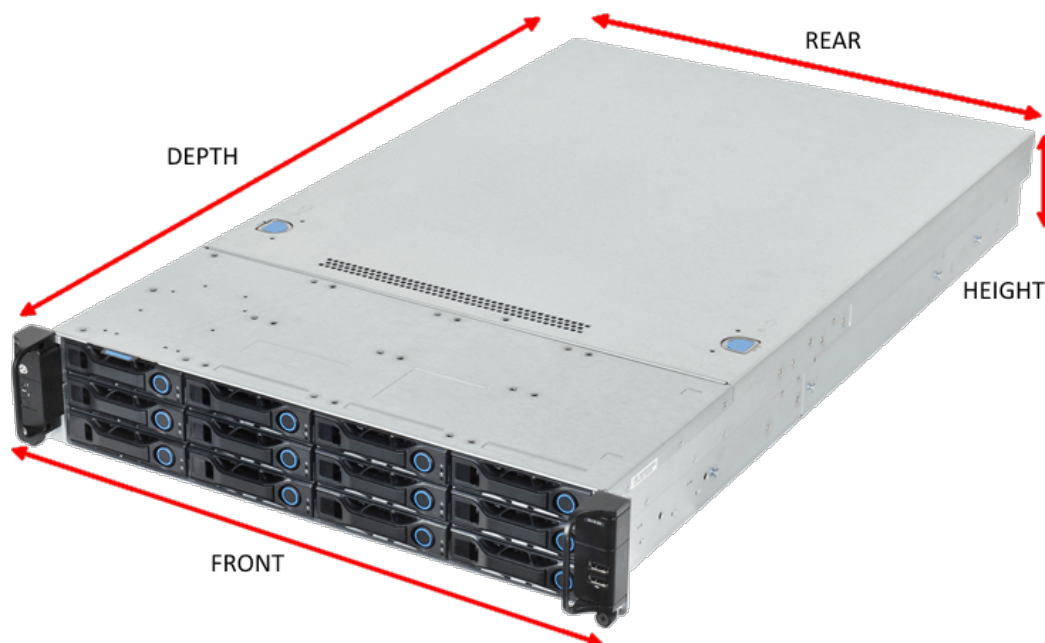
The following sections describe the mechanical specifications and requirements for an HCP G11 Node.

## Dimensions

The table below shows the physical dimensions of the HCP G11 Node.



The labels in the figure below identify the faces of the HCP G11 Node. Use this figure as a reference for the table of dimensions that follows.



The table below shows the physical dimensions of the server module.

Parameter	Inches	Millimeters
Server module depth — rack mounting surface to rear connectors surface	30.75	781
Total depth — front surface of handles to rear tab on power supply	32.63	829
Front width	17.6	447
Front width with rack ears	18.9	480
Rear width	17.6	447
Height (2U)	3.44	87.5

## Weight

The table below shows the weights of the various components of an HCP G11 Node and HCP G11 system.

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
<b><i>Servers with HDDs</i></b>			
HCP G11 Node attached storage base unit—includes enclosure, mounting rails, motherboard, drive backplane, riser card, two power supplies, six cooling fans, airflow baffle, two CPUs, four 16GB DIMMs or two 32GB DIMMs, six 4TB HDDs, six empty drive carriers, rear drive cage, 1Gb dual-port Ethernet OCP card, RAID mezzanine card, and 10Gb dual-port Ethernet PCIe card, 8Gb dual-port Fibre Channel card, and two power cables.		54.76 (24.89)	54.76 (24.89)
32GB DIMM	2	0.15 (0.0675)	0.3 (0.135)
1.9TB SSD	2	0.17 (0.0756)	0.34 (0.1512)
Dual-port 10Gb Ethernet PCIe card — optional	1	0.59 (0.27)	0.59 (0.27)

(Continued)

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
<b><i>Servers with all SSDs</i></b>			
HCP G11 Node attached storage base unit—includes enclosure, mounting rails, motherboard, drive backplane, riser card, two power supplies, four cooling fans, airflow baffle, two CPUs, twelve 32GB DIMMs, twelve SSDs, rear drive cage, 1Gb dual-port Ethernet OCP card, RAID mezzanine card, 10Gb dual-port Ethernet PCIe card, 8Gb dual-port Fibre Channel card, and two power cables.		54.76 (24.89)	54.76 (24.89)
Dual-port 10Gb Ethernet PCIe card — optional	1	0.59 (0.27)	0.59 (0.27)
<b><i>Ethernet Switches</i></b>			
Extreme 210-24t-GE2 (1G Small)	2	6.90 (3.13)	13.8 (6.26)
Extreme 210-48t-GE4 (1G Large)	2	8.27 (3.75)	16.54 (7.5)
Cisco 31108PC-V (10G Small)	2	21.4 (9.7)	42.8 (19.4)
Cisco 31128PQ (10G Small)	2	22.2 (10.1)	44.4 (20.2)
<b><i>Fibre Channel Switches</i></b>			
Brocade 6510	2	20.15 (9.16)	40.3 (18.32)
Cisco MDS 9148S	2	19.8 (9)	39.6 (18)

(Continued)

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
<b>Cables</b>			
Two meter AC power cable — two required for each switch except the Brocade ICX 6430 which requires one	2	0.5 (0.227)	1.0 (0.454)
Seven foot 1Gb Ethernet cable harness	2	3.08 (1.4)	6.16 (2.8)
Twenty-five foot 1Gb Ethernet cable harness	2	11 (5)	22 (10)
Three meter 10Gb Ethernet cable (Twinax)	2	0.1 (0.22)	0.2 (0.44)
Five meter 10Gb Ethernet cable (Twinax)	2	0.18 (0.4)	0.36 (0.8)
Ten meter 10Gb Ethernet cable (Twinax)	2	0.36 (0.79)	0.72 (1.58)
Three meter 8Gb Fibre Channel cable	2	0.022 (0.05)	0.044 (0.1)
<b>Rack &amp; PDU</b>			
Hitachi Universal V2 rack — includes two side panels, rear door, and accessory kit	1	225 (102.3)	225 (102.3)
1P32A-9C13-3C19CE.P	6	7.05 (3.2)	42.3 (10.24)
3P16A-9C13-3C19CE.P	6	7.05 (3.2)	42.3 (10.24)
1P30A-8C13-3C19UL.P	6	7.94 (3.6)	47.64 (21.6)
1P32A-18C13-3C19CE.P	4	7.94 (3.6)	31.76 (14.4)
3P16A-15C13-3C19CE.P	4	8.38 (3.8)	33.52 (15.2)
3P30A-8C13-3C19UL.P	6	8.82 (4.0)	52.92 (24)
1P30A-15C13-3C19UL.P	4	9.70 (4.4)	38.8 (17.6)
3P30A-15C13-3C19UL.P	4	10.58 (4.8)	42.32 (19.2)

*(Continued)*

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
3P32A-24C13-6C19CE.P	2	11.90 (5.4)	23.8 (10.8)
3P30A-24C13-6C19UL.P	2	12.35 (5.6)	24.7 (11.2)

## Hitachi Universal V2 rack

The table below shows the physical dimensions of the Hitachi Universal V2 rack used when the HCP G11 Node is purchased with a rack.

Parameter	Inches	mm
Width	23.63	600
Depth	47.25	1200
Height	79.06	2008

The weight of the empty rack, including the accessory kit, is 225.53 pounds (102.3 kg).

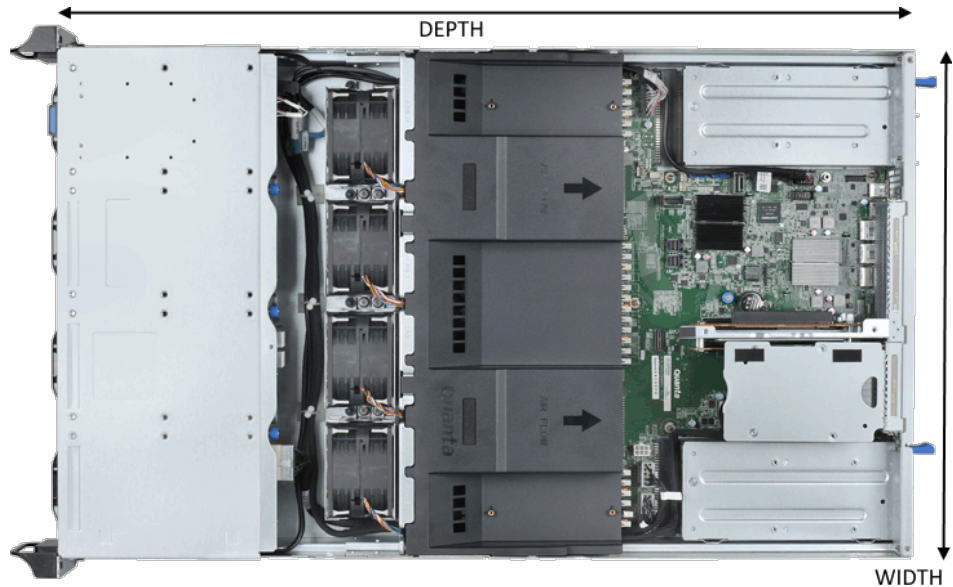
## Customer supplied rack

You can purchase HCP G11 Nodes without a rack and then install the servers into a rack you supply. If you are supplying the rack(s) for the HCP system, you are responsible for the components shown below:

- A rack that meets these requirements:
  - The rack must be a standard 19-inch rack.
  - The rack must have square holes in the vertical EIA rails.
  - The rack depth must be at least 43.3 inches (1,100mm). The depth of the server, depth of Ethernet switches, and necessary room for cable management necessitates this depth requirement.
  - The server depth shown in the following figure is 29.33 inches (745mm). The power supply tab adds about another inch (25mm). An HCP system requires approximately ten inches (250mm) in the rear of the rack for cable management. Since most racks have a

setback from the front of the rack to the vertical EIA rails the total depth required exceeds that of a 39.3 inch rack (1000mm).

- The width shown in the following figure is 17.6 inches (447mm) and the customer rack must accommodate this dimension. The width shown includes the rail kit required space.



- The distance between the outer surfaces of the front and rear vertical EIA rails should be a minimum of 29 inches (736.6mm). While the server rail kit is able to mount with a shorter depth, some of the Ethernet switch equipment, particularly Cisco Nexus 5548 or Cisco Nexus 5596 require this minimum distance.
- PDUs. Power distribution units need to provide the appropriate number of IEC 60320 C13 and C19 outlets and appropriate amperage to power the equipment installed in the rack. For proper redundancy, components in the rack should be connected to two PDUs, one for each of the power supplies provided. If a component only has one power supply it should be connected to the first PDU and its redundant counterpart should be connected to the second PDU.
- Please refer to the following table for the appropriate outlets required for each HCP system component.

Component	# of U	# of Outlets	Outlet Type
HCP G11 Node	2	2	C13
Brocade ICX 6430 1Gb Ethernet	1	1	C13
Brocade VDX 6740 10Gb Ethernet	1	2	C13
Cisco Nexus 5548 10Gb Ethernet	1	2	C13
Cisco Nexus 5596 10Gb Ethernet	2	2	C13
Brocade 6510 16Gb Fibre Channel	1	2	C13
Cisco MDS 9148S 16Gb Fibre Channel	1	2	C13

- For power requirements of each device, please see ["Electrical requirements"](#) below.
- For storage components, including HCP S10, HCP S30, or Hitachi storage arrays, please see the appropriate documentation for those devices to determine the appropriate rack space, outlet quantity, outlet type, and power capacity requirements.
- Velcro straps and/or cable ties for bundling and securing cables.
- Screws and caged nuts for installing equipment into the rack(s).

## Electrical requirements

The following sections describe the power requirements and electrical specifications for an HCP G11 Node and other required HCP system components.

### Power system

For redundancy, an HCP G11 Node has two. These power supplies should be connected to two different PDUs, which should be plugged into two separate power sources. This setup ensures that the entire power system has no

single point of failure.

If only one power source is available, the two PDUs should be plugged into different circuits. If only one circuit is available, the two power supplies can be connected to the same PDU as a last resort, assuming the PDU has two available outlets and enough power capacity.

The power system input can be either single-phase or three-phase with single phase on the outlets. The table below shows the power system requirements for the Hitachi Universal V2 PDU.

Hitachi Vantara part number	Geography	Phase	Length	Voltage	Amperage
1P30A-8C13-3C19UL.P	Americas	Single	24.49in (622mm)	208	30
1P30A-15C13-3C19UL.P	Americas	Single	35.24in (895mm)	208	30
3P30A-8C13-3C19UL.P	Americas	Three	24.49in (622mm)	208	30
3P30A-15C13-3C19UL.P	Americas	Three	35.24in (895mm)	208	30
3P30A-24C13-6C19UL.P	Americas	Three	51.85in (1,317mm)	208	30
1P32A-9C13-3C19CE.P	EMEA/APAC	Single	23.46in (596mm)	230	32
1P32A-18C13-3C19CE.P	EMEA/APAC	Single	35.16in (893)	230	32
3P16A-9C13-3C19CE.P	EMEA/APAC	Three	23.46in (596mm)	400	16
3P16A-15C13-3C19CE.P	EMEA/APAC	Three	33.62in (854mm)	400	16
3P32A-24C13-6C19CE.P	EMEA/APAC	Three	54.09in (1,374mm)	400	32



## Power connections

The power connections required by the Hitachi Universal V2 PDUs differ by geography and input phase:

- For the Americas:
  - The single-phase, 208V, 30A PDUs have a NEMA L6-30P three-wire plug, as shown below.



- The three-phase, 208V, 30A PDUs have a NEMA L15-30 four-wire plug, as shown below.

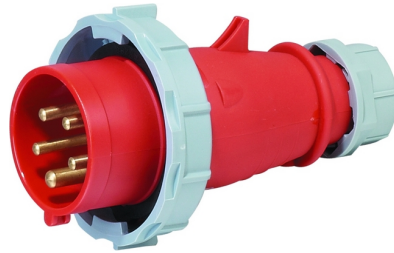


- For EMEA/APAC:
  - The single-phase, 230V, 32A PDUs have an IEC 309 three-wire plug, as shown below.



## Electrical requirements

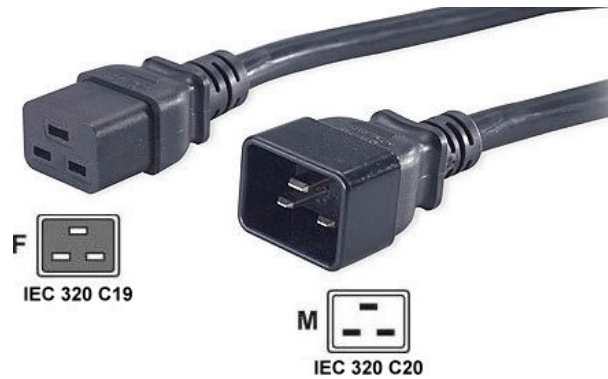
- The three-phase, 400V, 32A PDUs have an IEC309 five-wire power plug, as shown below.



Each HCP system comes with multiple PDUs with IEC 320 C13 and IEC 320 C19 outlets. Each HCP G11 Node has two power supplies with IEC 320 C14 power inlet connectors. Each power supply connects to a PDU using a two meter IEC 320 C13 to IEC 320 C14 power cable, as shown below. Optional Fibre Channel switches and Ethernet switches use two meter IEC 320 C13 to IEC 320 C14 power cables. External storage array options require appropriate power connections using two meter IEC 320 C13 to IEC 320 C14 power cables.



Optional S10 nodes that come in the same rack as an HCP system plug into the IEC 320 C19 power outlets on the PDUs. Each S10 storage node has two power and cooling modules which should be connected to the PDUs using two meter IEC 320 C19 to IEC 320 C20 power cables as shown below.



## Electrical specifications

In an HCP system, all electrical components are designed to be redundant. For each device in the system, there are either two power supplies or two of the devices so that there is no single point of failure if a power supply or PDU fails. In addition, since all components are redundant, the PDUs on different sides of the rack connect to different power systems, providing power system redundancy.

When an HCP system component with two power supplies is operating normally, each power supply contributes half the power that the device requires. If one power supplies fails, the HCP component continues to run on the single available power supply.

The table below describes the amperages and voltages of the different PDU models.

PDU model	Amperage	Voltage
3P30A-24C13-6C19UL.P	30	208
3P32A-24C13-6C19CE.P	32	400
3P30A-15C13-3C19UL.P	30	208
1P30A-15C13-3C19UL.P	30	208
3P16A-15C13-3C19CE.P	16	400

*(Continued)*

<b>PDU model</b>	<b>Amperage</b>	<b>Voltage</b>
1P32A-18C13-3C19CE.P	32	230
3P30A-8C13-3C19UL.P	30	208
1P30A-8C13-3C19UL.P	30	208
3P16A-9C13-3C19CE.P	16	400
1P32A-9C13-3C19CE.P	32	230

The table below describes the nominal amperage and wattage of each possible component in an HCP system.

<b>Component</b>	<b>Nominal amperage @ 208V (A)</b>	<b>Nominal wattage @ 208V (W)</b>
HCP G11 Node	1.26	262
Brocade ICX 6430	0.20	41.6
Brocade VDX 6740	0.86	179
Cisco Nexus 5548	1.88	391
Cisco Nexus 5596	2.14	445
Brocade 6510	0.39	81.1
Cisco MDS 9148S	0.88	183

## Environmental details

The following sections describe the environmental specifications and requirements for an HCP G11 system with Attached storage.

### RoHS compliance

AnHCP G11 Node, including all its components, is compliant with the European Union Restriction of Hazardous Substances (RoHS) Directive (Directive 2002/95/EC), with no exceptions or exemptions.

## BNST compliance

Benzenamine, *N*-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST) is an antioxidant used as an additive in many industrial lubricants. Its use has been restricted in Canada under the Prohibition of Certain Toxic Substances Regulations, 2012, which went into effect on March 14, 2013. The Regulations include a two-year exemption for BNST used in small-application lubricants in the electrical and electronics engineering industry.

## Temperature, humidity, and altitude

The table below shows the acceptable ranges for temperature, humidity, and altitude for the various HCP system components as well as an aggregate for the entire system. Operating and non-operating cases are included in the table below.

Component	* Operating temperature	Operating humidity (non-condensing)	Altitude	Non-operating temperature	Non-operating humidity (non-condensing)
HCP system (not including storage components)	5°C to 40°C (41°F to 104°F)	50%-85%	0-3000m (0-10,000 feet)	-25°C to 70°C (-13°F to 158°F)	20%-90%
HCP G11 Node	5°C to 40°C (41°F to 104°F)	50%-85%	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	20%-90%
Brocade ICX 6430	0°C to 40°C (32°F to 104°F)	5%-95%	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	0%-95%
Brocade VDX 6740	0°C to 40°C (32°F to 104°F)	10%-85%-	0-3048m (0-10,000 feet)	-25°C to 70°C (-13°F to 158°F)	10%-90%
Cisco Nexus 5548	0°C to 40°C (32°F to 104°F)	5%-95%-	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	5%-95%

(Continued)

Component	* Operating temperature	Operating humidity (non-condensing)	Altitude	Non-operating temperature	Non-operating humidity (non-condensing)
Cisco Nexus 5596	0°C to 40°C (32°F to 104°F)	5%-95%-	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	5%-95%
Brocade 6510	0°C to 40°C (32°F to 104°F)	10%-90%-	-60-3000m (-197-10,000 feet)	-25°C to 70°C (-13°F to 158°F)	10%-95%
Cisco MDS 9148S	0°C to 40°C (32°F to 104°F)	10%-90%-	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	10%-95%
*The maximum operating temperature value is specified at sea level and is derated 2.0% per 1,000 feet of increased altitude.					

## Shock and vibration

The table below shows the tested limits for shock and vibration for an HCP system and its components where this information is available.

Component	Operating shock	Non-operating shock	Operating vibration	Non-operating vibration
HCP system (not including storage components)	20G, 6ms, half-sine	33G, 11ms, half-sine, 3/eg axis	0.2Grms on z axis, 2 minutes	1.87Grms on 3 axes, 30 minutes
HCP G11 Node	31G, 2.6ms, ±5%, shock pulse 20in/sec or 51cm/sec, bottom side	71G (2ms) ±5%, shock pulse 35in/sec or 89cm/sec, 6 sides	0.2Grms on z axis, 2 minutes	1.87Grms on 3 axes, 30 minutes
Brocade ICX 6430	IEC 68-2-36, IEC 68-2-6			

(Continued)

Component	Operating shock	Non-operating shock	Operating vibration	Non-operating vibration
Brocade VDX 6740	20G, 11ms, half-sine	44G, 15ms, square wave	0.5G peak, 0.7Grms random, 5 to 500 Hz	2.0G sine, 1.4Grms random, 5 to 500 Hz
Cisco Nexus 5548	N/A	N/A	N/A	N/A
Cisco Nexus 5596	N/A	N/A	N/A	N/A
Brocade 6510	20G, 6ms, half-sine	33G, 11ms, half-sine, 3/eg axis	0.5G sine, 0.5Grms random, 5 to 500Hz	2.0G sine, 1.1Grms random, 5 to 500Hz
Cisco MDS 9148S	N/A	N/A	N/A	N/A

## Cooling and airflow

The airflow in of all components of an HCP system is designed to go from front to rear and is driven by fans on the various components. Air is pulled through the front of the rack and exhausted out the rear of the rack. Components mounted in the rack, such as Ethernet or Fibre Channel switches, have port side exhaust in keeping with the overall rack airflow. Customers should not reorient the devices in the rack or the airflow may be compromised.

The following table shows the heat dissipation for each of the components, allowing a customer to calculate the heat load and required cooling for their HCP system based on the components installed. It also includes the acoustic noise level of the fans in the units which are providing the airflow, where this information is available.

Component	Heat Dissipation (BTU/h)	Acoustic Noise Level (dB)
HCP G11 Node	894	N/A
Brocade ICX 6430	67	0 (Fanless)

*(Continued)*

Component	Heat Dissipation (BTU/h)	Acoustic Noise Level (dB)
Brocade VDX 6740	597	63.1
Cisco Nexus 5548	1331	N/A
Cisco Nexus 5596	2252	N/A

When a number of the HCP system components are powered on, the fans run at full speed for a short time to ensure that they are fully operational. After that, under normal conditions, the fans run at lower speeds as required by the device for maintaining appropriate airflow and cooling to the components. The cooling they provide is sufficient to prevent the hard disk drives and other components from exceeding the manufacturer's rated specifications throughout the range of the operating conditions. If over-temperature conditions occur, some of the devices have automatic shutdown capability, but not in all cases.

If a single fan fails in any of the HCP system components, the device continues to operate. However, this fault condition forces the remaining fans to run at higher speed until the condition is corrected.

## Required tools and supplies

When assembling, deploying, or maintaining an HCP system, you may need certain tools and supplies. The items you need for any given procedure are listed before the instructions for that procedure.

These are all the tools and supplies that may be required:

- **Lift** — Depending on the type of storage devices used in conjunction with the HCP system, a lift may be required to install or maintain disk storage trays into a rack. The lift must be rated at a minimum of 400 pounds (182kg).
- **Tools** — For installation and maintenance procedures on an HCP system, the following tools may be required:
  - #1 Phillips screwdriver
  - #2 Phillips screwdriver
  - 1/4-inch flat-head screwdriver



- Caged nut tool
- Wire cutter
- **Keyboard and monitor** — For the installation of the HCP software, or to perform diagnostics and recover the HCP software, you need a USB keyboard and VGA monitor.
- **Laptop computer** — To upload an HCP software update file, license file, or to use the management console you will need to use a browser on a laptop computer.
- **1Gb CAT6 Ethernet cable** — To connect the laptop computer to the back-end network switch, you need a 1Gb CAT6 Ethernet cable. For 10Gb systems, a 1Gb adapter for the switch will be provided.
- **PDUs with C13/C19 power outlets** — To provide power to the HCP system during installation, you need two PDUs with C13 and/or C19 outlets as appropriate for the system being configured. You need these PDUs only if the HCP system will be shipped without a rack.
- **One 4GB or larger USB flash drives** — For the HCP software installation, you need one 4GB or greater USB flash drive. For the best results, use the certified Hitachi Vantara part number DTI4GL.P



## Assembling rackless components

The components of a rackless HCP G11 with Attached Storage system are delivered configured but unassembled. You need to provide some additional components and assemble the system at your site. This chapter provides instructions for doing this.

### Components that come with a rackless system

For a rackless HCP G11 with Attached Storage system, the components are shipped to your site:

- The required numbers of nodes, with the HCP software already installed.
- The required number of storage arrays, with the HCP software already installed.
- One or Two Ethernet switches for the back-end network. The type and quantity of Ethernet switches you receive depends on your system network configuration. The possible switch types are:
  - **Brocade ICX 6430** — is a small, 1 GB Ethernet switch. You receive two Brocade ICX 6430 switches with your system.
  - **Brocade VDX 6740** — is a small, 10 GB Ethernet switch. You receive two Brocade VDX 6740 switches with your system.
  - **Cisco Nexus 5548UP** — is a small, 10 GB Ethernet switch. You receive two Cisco Nexus 5548 switches with your system.
  - **Cisco Nexus 5596UP** — is a large, 10 GB Ethernet switch. You receive two Cisco Nexus 5596 switches with your system.

- Depending on your order, you might receive two Fibre Channel switches. The possible switch types are:
  - **Cisco MDS 9148S** — is a small, 8 GB switch. You receive two Cisco 9148S switches with your system.
  - **Brocade 6510** — is a small, 8 GB switch. You receive two Brocade 6510 switches with your system.
- If you use a 1G network configuration, you are supplied with the required number of Ethernet cables harnesses, half red and half blue. If you use a 10G network configuration, you are supplied the required amount of Ethernet cables to connect your nodes to the back-end network.
- The required amount of Fibre Channel cables to connect your nodes to the Fibre Channel switches or storage array.
- The required amount of Power cords for the nodes, storage array, Fibre Channel switches, and back-end switches.
- An Ethernet cable for connecting back-end switches to each other if you are using a network configuration that supports two back-end switches — one purple cable for a 1 G network configuration or one black cable for a 10 G network configuration.
- The required number of perforated blanking plates for covering the back-end switches.
- One serial number label per system. This label is on the lower left side of the lowest node.
- The license-key packet. If the HCP software was installed with encryption enabled, this packet also includes the Encryption Key form.



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**Caution:** Store the Encryption Key form in a secure location. The key recorded on this form is not retrievable through the HCP System Management Console or management API. Loss of this key will most likely result in unrecoverable data in the case of catastrophic system failure.

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## Hardware assembly procedure

To assemble the HCP SAIN system, follow the steps outlined in the table below.

Step	Activity	More information
1	Prepare the rack for installation of the HCP system components.	<a href="#">Step 1: "Prepare the racks"</a> on page 57
2	Attach the HCP G11 System serial number sticker	<a href="#">Step 2: "Attach the HCP G11 system serial number"</a> on page 57
3	Install the PDUs in the rack	<a href="#">Step 3: "Install the PDUs"</a> on page 58
4	Optionally, Rack the HCP S11 Nodes	<a href="#">Step 3a: "Rack the HCP S11 Nodes"</a> on page 59
5	Optionally, rack the VSP-G storage array	<a href="#">Step 4 (conditional): "Rack the VSP-G"</a> on page 59
6	Rack the HCP G11 Nodes	<a href="#">Step 5: "Rack the HCP G11 Nodes"</a> on page 60
7	Optionally, rack the Fibre Channel switches	<a href="#">Step 6 (conditional): "Rack the Fiber switches"</a> on page 70
8	Rack the Ethernet switches	<a href="#">Step 7: "Rack the Ethernet Switches"</a> on page 95
9	Optionally, cover the unused rack units with blanking pates	<a href="#">Step 8 (conditional): "Install the blanking plates"</a> on page 134
10	Reassemble the rack	<a href="#">Step 9: "Reassemble the racks"</a> on page 136

## Considerations for HCP racking and PDU connections

This section describes the possible HCP system racking configurations and how to connect HCP hardware components to PDUs.

### Considerations for racking an HCP system

An HCP G11 system includes a minimum of four HCP G11 Nodes and a maximum of eighty HCP G11 Nodes. The nodes can be racked in a base configuration with Ethernet switches and optional Fibre Channel switches or in an appliance configuration with Ethernet switches, optional Fibre Channel switches, a VSP-G storage array, and optional HCP S10 Nodes.

In a base configuration, an HCP system can have up to five racks — one base configuration rack and, optionally, one through four expansion racks. A base configuration does not include a VSP-G or S10 Nodes.

In an appliance configuration, an HCP system can have only one rack but can be expanded with additional storage in secondary racks. An appliance configuration includes one or more VSP-G storage arrays or S10 Nodes.

If the HCP system in a base configuration uses expansion racks, those racks must be positioned on the right and left of the base or appliance configuration rack in alternating order so that all HCP G11 Nodes can connect to the back-end Ethernet switches.

The figure below shows how to position the racks.



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**Tip:** For ease of access, remove and set aside the rack side panels and doors before racking and cabling components.

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## Hitachi Universal V2 PDUs

HCP uses Hitachi Universal V2 PDUs.

### Outlet layout

A Hitachi Universal V2 PDU has three color-coded sections: blue, red, and yellow. The power inlet cable is attached to the blue end of the PDU.

Each colored-coded section has:

- One or two circuit breakers
- Some number of C19 outlets
- Some number of C13 outlets

In a section with two circuit breakers, the circuit breaker closer to the power inlet cable is number one.

The C19 and C13 outlets are counted separately for each circuit breaker within each section. For each type of outlet, the outlet closest to the applicable circuit breaker is number one.

Each outlet is identified by these properties, in order:

- The section color: B (blue), R (red), or Y (yellow)
- The breaker number: 1 or 2
- The outlet type: C19 or C13
- The number of the outlet within its section, preceded by a hyphen (-)

For example, the second C13 outlet for circuit breaker one in the red section is R1C13-2.

### **PDU part numbers**

Hitachi Universal V2 PDU part numbers describe the PDU model by its hardware characteristics and geographic distribution. Each PDU part number consists of these properties, in order:

- Phase: 1P or 3P
- Amperage: 16A, 30A, or 32A
- Number of C13 outlets: 8C13, 9C13, 15C13, 18C13, or 24C13
- Number of C19 outlets: 3C19 or 6C19
- Geographic distribution: UL (Americas) or CE (EMEA/APAC)
- Suffix: .P

For example, a three phase, EMEA/APAC PDU with an amperage of 32, 24 C13 outlets, and six C19 outlets is 3P24C13-6C19CE.P.

Not all possible part numbers are used. For example, no PDU has the part number 1P16A12C13-3C19UL.P.

## **Considerations for connecting PDUs**

A rack can have one, two, or three pairs of PDUs. In each pair, one PDU is installed on the left side of the rack. The other PDU is installed on the right side of the rack. For redundancy, the PDUs in each pair should, if possible,

be connected to two separate power sources.

If a hardware component has two power supplies. The left power supply connects to the left PDU. The right power supply connects to the right PDU.

To balance the HCP system electrical requirements across the PDU breakers and phases, the system hardware components connect to specific PDU outlets. These outlets are determined by the HCP system racking configuration and the PDU model.

## HCP racking and connection diagrams

The diagrams in this section show the possible HCP system racking configurations, how to rack the hardware components, and how to connect the hardware components to the PDUs.

### Selecting a diagram

To determine which racking and connection diagram to use, you need the HCP system packing list. If the packing list includes more than one HCP G11 system, select the diagram for each system individually.

To select a diagram for an HCP system:

1. In the packing list, check the "Configuration Parameters" section for the HCP system configuration. If the system configuration is:
  - "G11 rack: Non-appliance configuration," see [HCP G11 Base and Expansion diagrams](#) on page 46
  - "G11 rack: Appliance configuration (combine G11 and S10/VSP)" and the system does not include any HCP S10 Nodes, see [HCP G11 Appliance with VSP-G](#) on page 47
  - "G11 rack: Appliance configuration (combine G11 and S10/VSP)" and system includes one, two, or three HCP S10 Nodes, see [HCP G11 Appliance with S10 and Optional VSP-G](#) on page 47
2. From the diagrams in the applicable section, select the diagram that includes the PDU part number listed for the applicable system configuration in the packing list.
3. If the system configuration is "G11 rack: Non-appliance configuration," the PDU part number is 3P30A-24C13-6C19UL.P or 3P32A-24C13-6C19CE.P, and the system configuration description in the packing list is:



- "G11 rack: Install PDU with cables orientated towards ceiling," use [HCP G11 Base and Expansion with Three-phase Americas \(3P30A-24C13-6C19UL\) – Top power](#) on page 49.
- "G11 rack: Install PDU with cables orientated towards floor," use [Three-phase Americas \(3P30A-24C13-6C19UL\) – Bottom power](#) on page 50

For example, use [HCP G11 Base and Expansion with Three-phase Americas \(3P30A-24C13-6C19UL\) – Top power](#) on page 49 if, in the packing list:

- The HCP system is "G11 rack: Non-appliance configuration"
- The PDU model number is 3P30A-24C13-6C19UL.P
- The description is "G11 rack: Install PDU with cables orientated towards ceiling"

Each diagram shows the hardware configuration for a single rack. If the HCP system includes additional components that don't fit in the rack, ensure that you have additional racks, as needed.

### **Reading the diagrams**

Each racking and connection diagram shows a single rack. The view is from the rear of the rack.

Each diagram has:

- Three or four columns that show possible hardware configurations
- Left and right U# columns that show the rack units in which each hardware component is installed
- Left and right PDU outlet columns that show only the outlets used with the hardware configurations in the diagram
- Left and right PDU configuration columns that show the number of PDUs installed on each side of the rack and the orientation of each PDU

Each hardware component connects to the outlets that, in the diagram, are aligned with the bottom or only rack unit occupied by that component .

### Diagram legend

In each diagram:

- Hardware components that span columns are used in all the configurations shown in the diagram.
- Sections labeled "Empty" do not contain any hardware components for the applicable configuration.
- Rack units in italics with a gray background in the U# column show the PDU bracket locations.
- Outlets with darker background colors are C13 outlets. Outlets with lighter background colors are C19 outlets.
- Outlet background colors (blue, red, and yellow) correspond to the circuits on the PDUs.
- Outlets with black text are always used with the applicable component. Outlets with white text are used only if the applicable component has two power supplies.
- The "PWR" label on each PDU shows which end of the PDU has the power inlet cable.

The PDUs in the diagrams are not drawn to scale.

### Diagrams

The diagrams in this section are:

- HCP G11 Base and Expansion
  - [Single-phase Americas \(1P30A-15C13-3C19UL\) and EMEA/APAC \(1P32A-18C13-3C19CE\)](#) on page 48
  - [Three-phase Americas \(3P30A-24C13-6C19UL\) – Top power](#) on page 49
  - [Three-phase Americas \(3P30A-24C13-6C19UL\) – Bottom power](#) on page 50
  - [Three-phase EMEA/APAC \(3P32A-24C13-6C19CE\) – Top power](#) on page 51

- [Three-phase EMEA/APAC \(3P32A-24C13-6C19CE\) – Bottom power](#) on page 52
- [HCP G11 Appliance with VSP-G \(single- and three-phase Americas and EMEA/APAC\)](#) on page 53
- [HCP G11 Appliance with S10 and Optional VSP-G \(single- and three-phase Americas and EMEA/APAC\)](#) on page 54
- [HCP G11 Appliance with S11 or S31 \(single- and three-phase Americas and EMEA/APAC\)](#) on page 55

HCP G11 Base & Expansion Rack									
		Base 1/10G 1U switch		Base 1/10G 2U switch		Expansion			
Left PDU's		U#	Hardware (1-phase PDU)				U#	Right PDU's	
UPPER		U42	Empty	Empty		Empty	U42		UPPER
		U41					U41		
		U40					U40		
	Y1C13-5	U39		Ethernet switch			U39	Y1C13-5	
		U38					U38		
	Y1C13-4	U37		Ethernet switch			U37	Y1C13-4	
		U36	G11 node #16 (if ordered)				U36		
	Y1C13-3	U35					U35	Y1C13-3	
		U34	G11 node #15 (if ordered)				U34		
	Y1C13-2	U33					U33	Y1C13-2	
		U32	G11 node #14 (if ordered)				U32		
	Y1C13-1	U31					U31	Y1C13-1	
		U30	G11 node #13 (if ordered)				U30		
	R1C13-4	U29					U29	R1C13-4	
	R1C13-1	U28	Fiber Channel Switch (if ordered)				U28	R1C13-1	
	B1C19-1	U27	Fiber Channel Switch (if ordered)				U27	B1C19-1	
	R1C13-3*	U26	Ethernet switch	Empty		Empty	U26	R1C13-3	
	R1C13-2	U25	Ethernet switch				U25	R1C13-2*	
		U24	G11 node #12 (if ordered)				U24		
	B1C13-3	U23					U23	B1C13-3	
		U22	G11 node #11 (if ordered)				U22		
	B1C13-2	U21					U21	B1C13-2	
		U20	G11 node #10 (if ordered)				U20		
PWR	B1C13-1	U19					U19	B1C13-1	PWR
PWR		U18	G11 node #9 (if ordered)				U18		PWR
LOWER	B1C13-3	U17					U17	B1C13-3	LOWER
		U16	G11 node #8 (if ordered)				U16		
	B1C13-4	U15					U15	B1C13-4	
		U14	G11 node #7 (if ordered)				U14		
	B1C13-5	U13					U13	B1C13-5	
		U12	G11 node #6 (if ordered)				U12		
	R1C13-3	U11					U11	R1C13-3	
		U10	G11 node #5 (if ordered)				U10		
	R1C13-4	U9					U9	R1C13-4	
		U8	G11 node #4				U8		
	R1C13-5	U7					U7	R1C13-5	
		U6	G11 node #3				U6		
	Y1C13-3	U5					U5	Y1C13-3	
		U4	G11 node #2				U4		
	Y1C13-4	U3					U3	Y1C13-4	
		U2	G11 node #1				U2		
	Y1C13-5	U1					U1	Y1C13-5	

\* = Only used if the switch has 2 power supplies

\* = Only used if the switch has 2 power supplies

HCP G11 Base & Expansion Rack								
		Base 1/10G 1U switch	Base 1/10G 2U switch	Expansion				
Left PDU's		U#	Hardware (3-PHASE US PDU TOP POWER)		U#	Right PDU's		
PWR		U42	Empty	Empty	U42		PWR	
PDU		U41				U41		PDU
		U40				U40		
	B1C13-1	U39		Ethernet switch	Empty	U39	B1C13-1	
		U38				U38		
	B1C13-2	U37	Ethernet switch		U37	B1C13-2		
		U36	G11 node #16 (if ordered)			U36		
	B1C13-3	U35				U35	B1C13-3	
		U34	G11 node #15 (if ordered)			U34		
	B1C13-4	U33				U33	B1C13-4	
		U32	G11 node #14 (if ordered)			U32		
	B1C13-5	U31				U31	B1C13-5	
		U30	G11 node #13 (if ordered)			U30		
	B1C13-6	U29				U29	B1C13-6	
	R1C13-1	U28	Fiber Channel Switch (if ordered)			U28	R1C13-1	
	R1C19-1	U27	Fiber Channel Switch (if ordered)			U27	R1C19-1	
	B1C13-7*	U26	Ethernet switch	Empty	Empty	U26	B1C13-7	
	B1C13-8	U25	Ethernet switch			U25	B1C13-8*	
		U24	G11 node #12 (if ordered)			U24		
	R1C13-3	U23				U23	R1C13-3	
		U22	G11 node #11 (if ordered)			U22		
	R1C13-4	U21				U21	R1C13-4	
		U20	G11 node #10 (if ordered)			U20		
	R1C13-5	U19				U19	R1C13-5	
		U18	G11 node #9 (if ordered)			U18		
	R1C13-6	U17				U17	R1C13-6	
		U16	G11 node #8 (if ordered)			U16		
	R1C13-7	U15				U15	R1C13-7	
		U14	G11 node #7 (if ordered)			U14		
	R1C13-8	U13				U13	R1C13-8	
		U12	G11 node #6 (if ordered)			U12		
	Y1C13-3	U11				U11	Y1C13-3	
	U10	G11 node #5 (if ordered)			U10			
Y1C13-4	U9				U9	Y1C13-4		
	U8	G11 node #4			U8			
Y1C13-5	U7				U7	Y1C13-5		
	U6	G11 node #3			U6			
Y1C13-6	U5				U5	Y1C13-6		
	U4	G11 node #2			U4			
Y1C13-7	U3				U3	Y1C13-7		
	U2	G11 node #1			U2			
Y1C13-8	U1				U1	Y1C13-8		

\* = Only used if the switch has 2 power supplies

**HCP G11 Base & Expansion Rack**

		Base 1/10G 1U switch		Base 1/10G 2U switch		Expansion				
Left PDU's		U#	Hardware (3-PHASE US PDU BOTTOM POWER)					U#	Right PDU's	
PDU		U42	Empty	Empty		Empty		U42		PDU
		U41			U41					
		U40			U40					
	Y1C13-8	U39		Ethernet switch			U39	Y1C13-8		
		U38		Ethernet switch			U38			
	Y1C13-7	U37				U37	Y1C13-7			
		U36	G11 node #16 (if ordered)					U36		
	Y1C13-6	U35						U35	Y1C13-6	
		U34	G11 node #15 (if ordered)					U34		
	Y1C13-5	U33						U33	Y1C13-5	
		U32	G11 node #14 (if ordered)					U32		
	Y1C13-4	U31						U31	Y1C13-4	
		U30	G11 node #13 (if ordered)					U30		
	Y1C13-3	U29						U29	Y1C13-3	
	R1C13-8	U28	Fiber Channel Switch (if ordered)					U28	R1C13-8	
	R1C19-1	U27	Fiber Channel Switch (if ordered)					U27	R1C19-1	
	Y1C13-2*	U26	Ethernet switch	Empty	Empty		U26	Y1C13-2		
	Y1C13-1	U25	Ethernet switch				U25	Y1C13-1*		
		U24	G11 node #12 (if ordered)					U24		
	R1C13-6	U23						U23	R1C13-6	
		U22	G11 node #11 (if ordered)					U22		
	R1C13-5	U21						U21	R1C13-5	
		U20	G11 node #10 (if ordered)					U20		
	R1C13-4	U19						U19	R1C13-4	
		U18	G11 node #9 (if ordered)					U18		
	R1C13-3	U17						U17	R1C13-3	
		U16	G11 node #8 (if ordered)					U16		
	R1C13-2	U15						U15	R1C13-2	
		U14	G11 node #7 (if ordered)					U14		
	R1C13-1	U13						U13	R1C13-1	
		U12	G11 node #6 (if ordered)					U12		
	B1C13-8	U11						U11	B1C13-8	
	U10	G11 node #5 (if ordered)					U10			
B1C13-7	U9						U9	B1C13-7		
	U8	G11 node #4					U8			
B1C13-6	U7						U7	B1C13-6		
	U6	G11 node #3					U6			
B1C13-5	U5						U5	B1C13-5		
	U4	G11 node #2					U4			
B1C13-4	U3						U3	B1C13-4		
	U2	G11 node #1					U2			
PWR	B1C13-3	U1						U1	B1C13-3	PWR

\* = Only used if the switch has 2 power supplies



**HCP G11 Base & Expansion Rack**

		Base 1/10G 1U switch		Base 1/10G 2U switch		Expansion				
Left PDU's		U#	Hardware (3-PHASE EMEA PDU TOP POWER)				U#	Right PDU's		
PWR		U42	Empty	Empty		Empty	U42		PWR	
PDU		U41					U41			
		U40					U40			
	B1C13-1	U39		Ethernet switch				U39	B1C13-1	
		U38						U38		
	B1C13-2	U37	Ethernet switch			U37	B1C13-2			
		U36	G11 node #16 (if ordered)				U36			
	B1C13-3	U35					U35	B1C13-3		
		U34	G11 node #15 (if ordered)				U34			
	B1C13-4	U33					U33	B1C13-4		
		U32	G11 node #14 (if ordered)				U32			
	B2C13-5	U31					U31	B2C13-5		
		U30	G11 node #13 (if ordered)				U30			
	B2C13-6	U29					U29	B2C13-6		
	R1C13-1	U28	Fiber Channel Switch (if ordered)				U28	R1C13-1		
	R1C19-1	U27	Fiber Channel Switch (if ordered)				U27	R1C19-1		
	B1C13-7*	U26	Ethernet switch	Empty		Empty	U26	B1C13-7		
	B1C13-8	U25	Ethernet switch				U25	B1C13-8*		
		U24	G11 node #12 (if ordered)				U24			
	R1C13-3	U23					U23	R1C13-3		
		U22	G11 node #11 (if ordered)				U22			
	R1C13-4	U21					U21	R1C13-4		
		U20	G11 node #10 (if ordered)				U20			
	R2C13-5	U19					U19	R2C13-5		
		U18	G11 node #9 (if ordered)				U18			
	R2C13-6	U17					U17	R2C13-6		
		U16	G11 node #8 (if ordered)				U16			
R2C13-7	U15					U15	R2C13-7			
	U14	G11 node #7 (if ordered)				U14				
R2C13-8	U13					U13	R2C13-8			
	U12	G11 node #6 (if ordered)				U12				
Y1C13-3	U11					U11	Y1C13-3			
	U10	G11 node #5 (if ordered)				U10				
Y1C13-4	U9					U9	Y1C13-4			
	U8	G11 node #4				U8				
Y2C13-5	U7					U7	Y2C13-5			
	U6	G11 node #3				U6				
Y2C13-6	U5					U5	Y2C13-6			
	U4	G11 node #2				U4				
Y2C13-7	U3					U3	Y2C13-7			
	U2	G11 node #1				U2				
Y2C13-8	U1					U1	Y2C13-8			

\* = Only used if the switch has 2 power supplies

**HCP G11 Base & Expansion Rack**

		Base 1/10G 1U switch		Base 1/10G 2U switch		Expansion				
Left PDU's		U#	Hardware (3-PHASE EMEA PDU BOTTOM POWER)					U#	Right PDU's	
PDU		U42	Empty	Empty		Empty		U42		PDU
		U41						U41		
		U40						U40		
	Y2C13-8	U39		Ethernet switch				U39	Y2C13-8	
		U38						U38		
	Y2C13-7	U37	Ethernet switch				U37	Y2C13-7		
		U36	G11 node #16 (if ordered)					U36		
	Y2C13-6	U35						U35	Y2C13-6	
		U34	G11 node #15 (if ordered)					U34		
	Y2C13-5	U33						U33	Y2C13-5	
		U32	G11 node #14 (if ordered)					U32		
	Y1C13-4	U31						U31	Y1C13-4	
		U30	G11 node #13 (if ordered)					U30		
	Y1C13-3	U29						U29	Y1C13-3	
	R2C13-8	U28	Fiber Channel Switch (if ordered)					U28	R2C13-8	
	R2C19-1	U27	Fiber Channel Switch (if ordered)					U27	R2C19-1	
	Y1C13-2*	U26	Ethernet switch	Empty		Empty		U26	Y1C13-2	
	Y1C13-1	U25	Ethernet switch					U25	Y1C13-1*	
		U24	G11 node #12 (if ordered)					U24		
	R2C13-6	U23						U23	R2C13-6	
		U22	G11 node #11 (if ordered)					U22		
	R2C13-5	U21						U21	R2C13-5	
		U20	G11 node #10 (if ordered)					U20		
	R1C13-4	U19						U19	R1C13-4	
		U18	G11 node #9 (if ordered)					U18		
	R1C13-3	U17						U17	R1C13-3	
		U16	G11 node #8 (if ordered)					U16		
	R1C13-2	U15						U15	R1C13-2	
		U14	G11 node #7 (if ordered)					U14		
	R1C13-1	U13						U13	R1C13-1	
		U12	G11 node #6 (if ordered)					U12		
	B2C13-8	U11						U11	B2C13-8	
		U10	G11 node #5 (if ordered)					U10		
B2C13-7	U9						U9	B2C13-7		
	U8	G11 node #4					U8			
B2C13-6	U7						U7	B2C13-6		
	U6	G11 node #3					U6			
B2C13-5	U5						U5	B2C13-5		
	U4	G11 node #2					U4			
B1C13-4	U3						U3	B1C13-4		
	U2	G11 node #1					U2			
PWR	B1C13-3	U1						U1	B1C13-3	PWR

\* = Only used if the switch has 2 power supplies



HCP G11 Appliance with Storage										
		2U controller with DBS/DBL	4U controller with DBS/DBL	2U controller with DB60	4U controller with DB60					
Left PDU's		U#	Hardware (1-phase & 3-phase, US & EMEA)			U#	Right PDU's			
UPPER		U42	G11 node #8 (if ordered)			U42				
	Y1C13-2	U41				U41				Y1C13-2
		U40	G11 node #7 (if ordered)			U40				
	Y1C13-1	U39				U39				Y1C13-1
		U38	G11 node #6 (if ordered)			U38				
	R1C13-3	U37				U37				R1C13-3
		U36	G11 node #5 (if ordered)			U36				
	R1C13-2	U35				U35				R1C13-2
		U34	G11 node #4			U34				
	R1C13-1	U33				U33				R1C13-1
		U32	G11 node #3			U32				
	B1C13-3	U31				U31				B1C13-3
		U30	G11 node #2			U30				
	B1C13-2	U29				U29				B1C13-2
	U28	G11 node #1			U28					
PWR	B1C13-1				U27				U27	B1C13-1
PWR	Y1C13-2*	U26	Ethernet switch			U26	Y1C13-2	PWR		
MIDDLE	Y1C13-1	U25	Ethernet switch			U25	Y1C13-1*			
	R1C13-3	U24	SVP			U24	R1C13-3			
		U23	Empty		Empty	Empty	U23			
		U22	DBS/DBL Tray				U22			
	R1C13-2	U21	DBS/DBL Tray				U21	R1C13-2		
		U20	DBS/DBL Tray				U20			
	R1C13-1	U19	DBS/DBL Tray		DB60 Tray	DB60 Tray	U19	R1C13-1		
		U18	DBS/DBL Tray				U18			
	B1C13-3	U17	DBS/DBL Tray				U17	B1C13-3		
		U16	DBS/DBL Tray				U16			
	B1C13-2	U15	DBS/DBL Tray				U15	B1C13-2		
		U14	DBS/DBL Tray				U14			
	PWR	B1C13-1	U13	DBS/DBL Tray		DB60 Tray	DB60 Tray	U13	B1C13-1	PWR
	PWR		U12	DBS/DBL Tray				U12	PWR	
B1C13-1	U11	DBS/DBL Tray		U11	B1C13-1					
LOWER		U10	DBS/DBL Tray		DB60 Tray	DB60 Tray	U10			
	B1C13-2	U9	DBS/DBL Tray				U9	B1C13-2		
		U8	DBS/DBL Tray				U8			
	R1C13-1	U7	DBS/DBL Tray				U7	R1C13-1		
		U6	Empty	4U controller	Empty	4U controller	U6			
		U5					U5			
		U4					U4			
	Y1C13-1	U3	2U controller		2U controller		U3	Y1C13-1		
		U2	Empty				U2			
		U1					U1			

\* = Only used if the switch has 2 power supplies

## HCP G11 Appliance with Storage

		2U controller with DBS/DBL	4U controller with DBS/DBL	2U controller with DB60	4U controller with DB60					
Left PDU's		U#	Hardware (1-phase & 3-phase, US & EMEA)			U#	Right PDU's			
UPPER		U42	G11 node #8 (if ordered)			U42	UPPER			
	Y1C13-2	U41				U41		Y1C13-2		
		U40	G11 node #7 (if ordered)			U40				
	Y1C13-1	U39				U39		Y1C13-1		
		U38	G11 node #6 (if ordered)			U38				
	R1C13-3	U37				U37		R1C13-3		
		U36	G11 node #5 (if ordered)			U36				
	R1C13-2	U35				U35		R1C13-2		
		U34	G11 node #4			U34				
	R1C13-1	U33				U33		R1C13-1		
		U32	G11 node #3			U32				
	B1C13-3	U31				U31		B1C13-3		
		U30	G11 node #2			U30				
	B1C13-2	U29				U29		B1C13-2		
		U28	G11 node #1			U28				
PWR	B1C13-1	U27				U27	B1C13-1	PWR		
PWR	Y1C13-2*	U26	Ethernet switch			U26	Y1C13-2	PWR		
MIDDLE	Y1C13-1	U25	Ethernet switch			U25	Y1C13-1*	MIDDLE		
	R1C13-3	U24	SVP			U24	R1C13-3			
		U23	Empty		Empty	U23				
		U22	DBS/DBL Tray			Empty			U22	
	R1C13-2	U21							U21	
		U20	DBS/DBL Tray		DB60 Tray	U20				
	R1C13-1	U19				U19			R1C13-1	
		U18	DBS/DBL Tray			DB60 Tray			U18	
	B1C13-3	U17			U17		B1C13-3			
		U16	DBS/DBL Tray	4U Controller	DB60 Tray	U16				
	B1C13-2	U15				U15			B1C13-2	
		U14				2U Controller			2U Controller	U14
	PWR	B1C13-1	U13	U13	B1C13-1		PWR			
	PWR		U12	CMA			U12			PWR
	LOWER		U11	HCP Sx1			U11		LOWER	
R1C19-1		U10	CS4U100 (use the C13 connector)			U10	R1C19-1			
R1C13-1		U9	or			U9	R1C13-1			
R1C13-2		U8	JD 4U106 (use the C19 connector)			U8	R1C13-2			
		U7	CMA			U7				
		U6	HCP Sx1 CS 4U100			U6				
		U5				U5				
Y1C13-1		U4				U4	Y1C13-1			
Y1C13-2		U3				U3	Y1C13-2			
		U2	Empty			U2				
	U1	U1								

\* = Only used if the switch has 2 power supplies

## HCP G11 Appliance with Storage

		2U controller with DBS/DBL	4U controller with DBS/DBL	2U controller with DB60	4U controller with DB60		
Left PDU's		U#	Hardware (1-phase & 3-phase, US & EMEA)			U#	Right PDU's
UPPER		U42	G11 node #8 (if ordered)			U42	UPPER
	Y1C13-2	U41				U41	
		U40	G11 node #7 (if ordered)			U40	
	Y1C13-1	U39				U39	
		U38	G11 node #6 (if ordered)			U38	
	R1C13-3	U37				U37	
		U36	G11 node #5 (if ordered)			U36	
	R1C13-2	U35				U35	
		U34	G11 node #4			U34	
	R1C13-1	U33				U33	
		U32	G11 node #3			U32	
	B1C13-3	U31				U31	
		U30	G11 node #2			U30	
	B1C13-2	U29				U29	
		U28	G11 node #1			U28	PWR
PWR	B1C13-1	U27				U27	
PWR	Y1C13-2*	U26	Ethernet switch			U26	Y1C13-2
	Y1C13-1	U25	Ethernet switch			U25	Y1C13-1*
MIDDLE		U24	Empty			U24	MIDDLE
		U23				U23	
		U22	CMA			U22	
		U21	HCP Sx1 CS4U100 (use the C13 connector) or JD 4U106 (use the C19 connector)			U21	
	R1C13-2	U20				U20	
	R1C13-1	U19				U19	
	R1C19-1	U18				U18	
		U17	CMA			U17	
		U16	HCP Sx1 CS4U100 (use the C13 connector) or JD 4U106 (use the C19 connector)			U16	
	B1C13-2	U15				U15	
	B1C13-1	U14				U14	
	PWR	B1C19-1				U13	B1C19-1
	PWR		CMA			U12	PWR
		U11	HCP Sx1 CS4U100 (use the C13 connector) or JD 4U106 (use the C19 connector)			U11	LOWER
	R1C19-1	U10				U10	
	R1C13-1	U9				U9	
	R1C13-2	U8				U8	
		U7	CMA			U7	
		U6	HCP Sx1 CS 4U100			U6	
		U5				U5	
	Y1C13-1	U4				U4	
	Y1C13-2	U3				U3	
		U2	Empty			U2	
		U1				U1	

\* = Only used if the switch has 2 power supplies



## Considerations for racking Nodes

An HCP G11 system can be racked with up to three HCP S10 Nodes in a single rack. If you are racking HCP S10 Nodes, you need to rack the S10 Nodes first at the bottom of the rack.

If the HCP system has more than three HCP S10 Nodes, the extra HCP S10 Nodes need to be racked in separate expansion racks. For more information about racking an HCP S10 Node expansion rack, see the *HCP S10 Node Assembly and Configuration* manual.

If the HCP system uses HCP S30 Nodes, the HCP S30 Nodes need to be racked in separate expansion racks. For more information about racking an HCP S30 Node rack, see the *HCP S30 Node Assembly and Configuration* manual.

If the HCP system uses HCP S11 and S31 Nodes, you must adjust the front vertical mounting rails. For more information, see the *HCP S11 and S31 Node Assembly and Configuration* manual.



**Important:** S11 and S31 Node shock and vibration data is unavailable at this time. Therefore, do not ship with these nodes installed in a rack.

---

## Power cords

Each type of Ethernet switch comes with either one or two power cords depending on its needs. The power cords provided with the switches require PDUs with C13 IEC receptacles. DS220 servers come with two power cords each that also require PDUs with C13 IEC receptacles.

If your PDUs are not compatible with either of these types of power cords, you need to provide alternative power cords as applicable. The power cords you provide must have a C13 IEC plug at the end that connects to the server or switch.

## Rackless assembly recommendation

The following rackless assembly procedure assumes you obey the HCP recommended rack and network setup configurations. If you deviate from the recommended configurations, you are responsible for providing all extra equipment and modifying the HCP system environment to accommodate for your changes. If you do not follow the recommended rack and network setups, it may cause future system expansion complications.

## Rackless assembly recommendation

The following rackless assembly procedure assumes you obey the HCP recommended rack and network setup configurations. If you deviate from the recommended configurations, you are responsible for providing all extra equipment and modifying the HCP system environment to accommodate for your changes. If you do not follow the recommended rack and network setups, it may cause future system expansion complications.

## Tools and accessories you need

To assemble an HCP G11 with Attached Storage system, you need these tools:

- #2 Phillips screwdriver
- Cage-nut tool
- Wire cutter for trimming any cable ties you use
- Front panel key



**Tip:** Assembling the server rails is easiest with a magnetic screwdriver.

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## Step 1: Prepare the racks

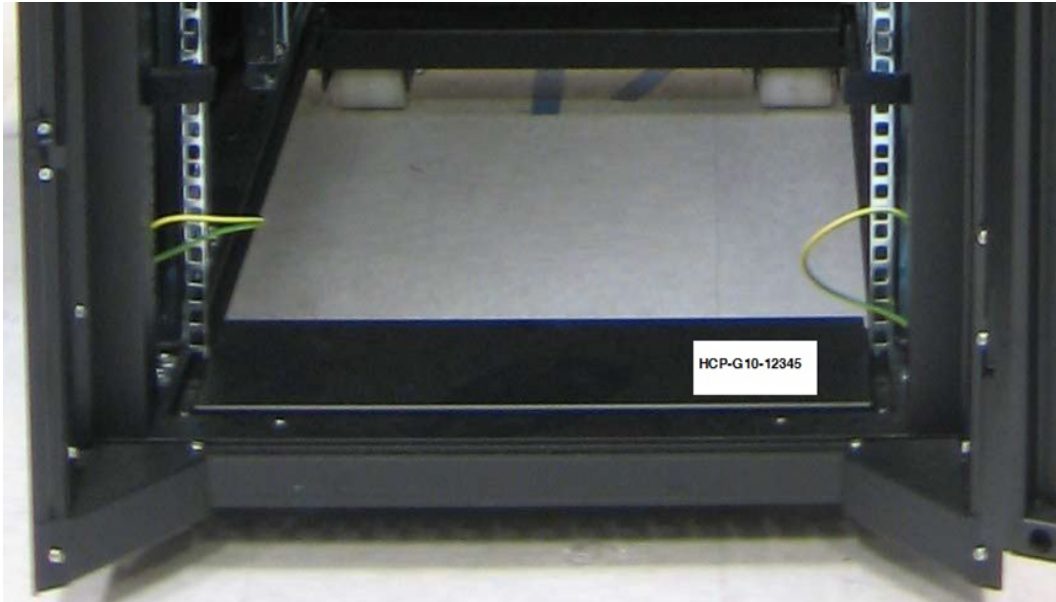
To facilitate the system assembly, remove the doors and sides from your racks.

## Step 2: Attach the HCP G11 system serial number

Each HCP G11 system is identified with a system serial number. This serial number is printed on a white rectangular sticker that needs to be affixed to the rear of the Appliance or Base rack. Serial number stickers are not applied to Expansion racks.

HCP G11 system serial number stickers are applied to the bottom right of the front side of Appliance or Base racks.

### Step 3: Install the PDUs



To attach an HCP G11 serial number sticker to the rack:

1. Locate the area where the sticker will be applied and clean it. The surface needs to be dry. If you feel it's necessary, use alcohol to clean the surface.
2. Remove the serial number sticker from the backing liner without touching the adhesive side.
3. Attach the serial number sticker by sticking it on the rack and sliding your finger across it from left to right.

## Step 3: Install the PDUs

Install the PDUs in the rack.

For instructions on installing PDUs, see the *Hitachi Universal V2 PDU Installation, Replacement, and Removal* manual.

## Considerations for racking VSP-G storage arrays

An HCP G11 system can be racked with five models of Hitachi Virtual Storage Platform G (VSP-G) array controllers: G200, G400, G600, G800, and G1100. This manual only shows racking configurations that use VSP-G

G200, G400, and G600 storage array controller models. For more information about VSP-G G800 and G1100 racking configurations, see the appropriate VSP-G documentation.

A VSP-G storage array can be racked so that it directly connects to a maximum of eight HCP G11 Nodes. If the HCP system uses more than eight HCP G11 Nodes, you need to rack the storage array in a separate expansion rack and install Fibre Channel switches in each rack. The Fibre Channel switches connect additional nodes to the storage array.

If there are no HCP S10 Nodes in the rack, the VSP-G storage array components are racked on the bottom of the rack and need to be racked first. If there are HCP S10 Nodes in the rack, the storage array components are racked above the HCP S10 Nodes and need to be racked second.

If the HCP system uses multiple storage arrays, the extra arrays need to be racked in separate expansion racks and connected to the HCP G11 Nodes using Fibre Channel switches. For more information about racking storage array expansion racks, see the appropriate VSP-G documentation.

### **Step 3a: Rack the HCP S11 Nodes**

Rack the HCP S11 Nodes in the rack.

For more information about how to rack the HCP S11 Nodes, see the *HCP S11 Assembly and Configuration* documentation.

### **Step 3b: Connect the HCP S11 Nodes to the PDUs**

Connect the power cables of the HCP S11 Nodes to the PDUs.

For more information about which PDU outlets to plug the power cables of each HCP S11 Node into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

### **Step 4 (conditional): Rack the VSP-G**

If the HCP system uses a VSP-G storage array, you need to rack the storage array. This section describes how to rack a VSP-G storage array and connect it to the PDUs.

#### **Step 4a: Rack the VSP-G storage array**

Rack the VSP-G storage array in the rack.

For more information about which rack units to rack the VSP-G storage array, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

For more information about , see ["Considerations for racking VSP-G storage arrays"](#) on page 58.

For more information about how to rack the VSP-G storage array, see the appropriate VSP-G documentation.

### **Step 4b: Connect the VSP-G to the PDUs**

Connect the VSP-G power cables to the PDUs.

For more information about which PDU outlets to plug the VSP-G power cables into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

## **Step 5: Rack the HCP G11 Nodes**

This section describes how to rack the HCP G11 Nodes and connect them to the PDUs.

If you are building an HCP G11 system in a base configuration with optional expansion racks, the HCP G11 nodes are the first components to be racked. A base configuration supports up to eighty HCP G11 Nodes.

If you are racking an HCP G11 system in an appliance configuration, all of the other storage components need to be installed in the rack before you rack the G11 Nodes. An appliance configuration supports up to six HCP G11 Nodes in the rack.

For more information about which rack units to rack the HCP G11 Nodes, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

### **Step 5a: Separate the inner and outer server rails**

A server rail kit consists of two sets of inner and outer rails. The rails are universal; that is, each set of rails can be used for either the left or right side of the server.

In a new server rail kit, the inner rails are nested inside the outer rails. You need to separate them so that you can attach the inner rails to the server and the outer rails in the rack.



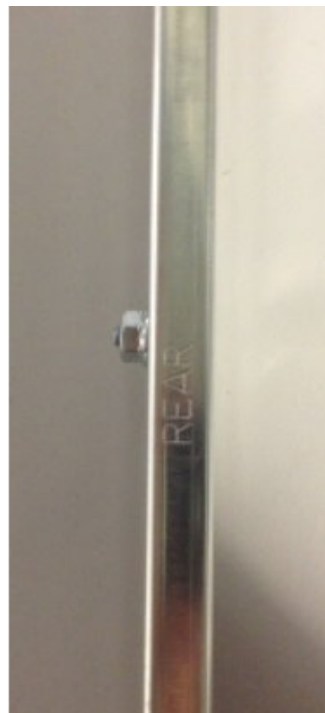
The figure below shows an inner rail nested inside an outer rail.



The figure below shows the inner and outer rails separated from each other. The outer rail is on top.

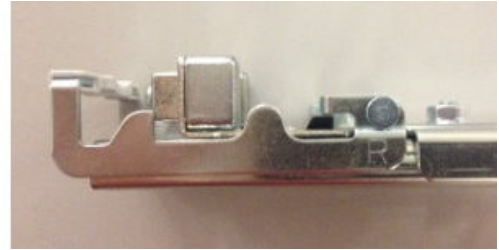


The word FRONT is stamped on the top and bottom lips of each outer rail at the front of the rail. The word REAR is stamped on the top and bottom of each rail at the rear of the rail.



## Step 5: Rack the HCP G11 Nodes

At the rear of each outer rail, the letter L is stamped on one lip and the letter R is stamped on the other lip. With the letter L facing up, the rail goes on the left side of the rack, when viewed from the front of the rack. With the letter R facing up, the rail goes on the right side of the rack.

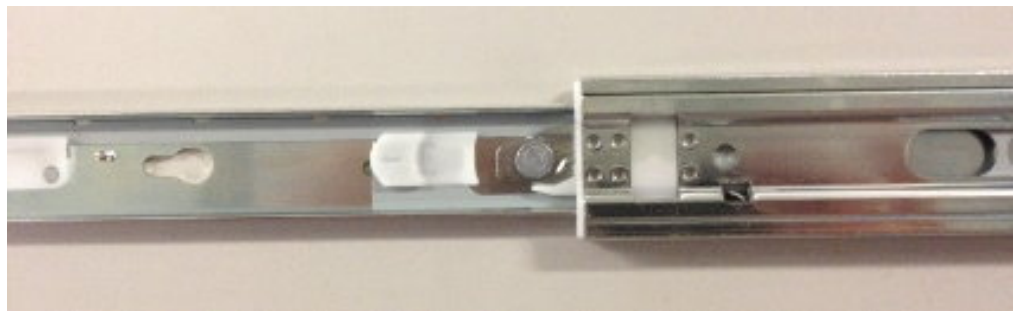


To separate the inner and outer server rails:

1. Slide the inner rail out of the outer rail toward the front until it locks into place.

The inner part of the outer rail slides also slides out.

2. While pulling forward the white tab on the side of the inner rail that faces the outer rail, slide the inner rail forward to release it from the outer rail. Then slide the inner rail all the way out of the outer rail.



3. Slide the inner part of the outer rail back into the outer rail. To do this, while pressing down on the metal tab on the inner part of the outer rail, slide the inner part toward the back to release it. Then slide the inner part all the way back into the outer rail.



### Step 5b: Attach the inner rails to the server

The two inner rails in the server rail kit attach to the sides of the server. Each rail can attach to either side of the server.

To attach an inner rail to a server:

1. Position the rail on the side of the server so that the white tab on the rail faces out and the studs on the server fit into the holes in the rail.



2. While pushing the rail against the server, slide the rail toward the back of the server until the rail locks into place.

### Step 5c: Install the outer server rails in the rack

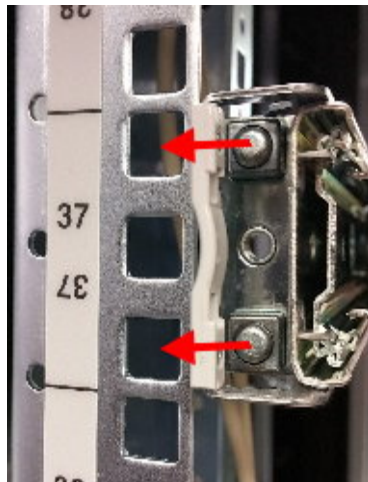
The two outer rails in the server rail kit attach to the sides of the rack. Each rail can attach to either side of the rack.

## Step 5: Rack the HCP G11 Nodes

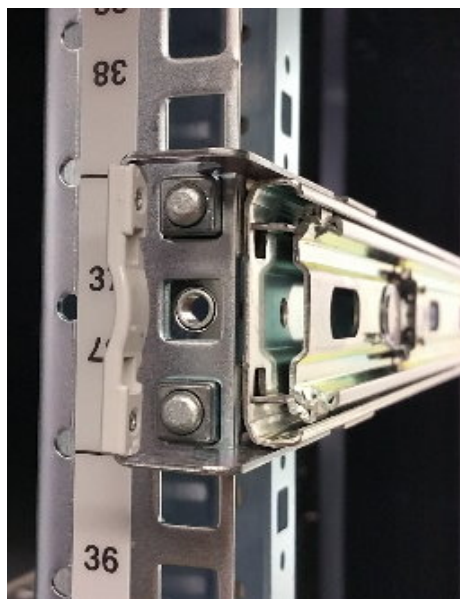
The outer rails are installed in the lower of the two rack units the server will occupy. For example, if the server will occupy rack units 37 and 38, the outer rails are installed in rack unit 37.

To install an outer rail in the rack:

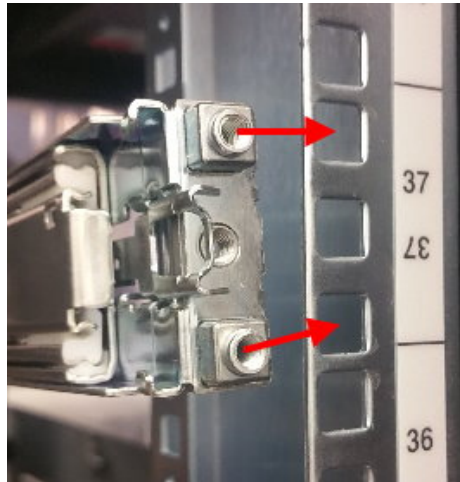
1. At the rear of the rack, with the inside of the outer rail facing into the rack, align the two square studs at the rear of the rail with the back of the top and bottom square holes for the applicable rack unit in the vertical mounting rail.



2. Fit the studs into the holes in the vertical mounting rail and pull the outer rail toward the rear of the rack until the back of the outer rail locks into place.



3. At the front of the rack, align the two square studs at the front of the outer rail with the back of the top and bottom square holes for the applicable rack unit in vertical mounting rail.



4. Fit the studs into the holes in the vertical mounting rail and pull the outer rail toward the front of the rack until the front of the outer rail locks into place.



## Step 5d: Mount the server in the rack

To mount a server in a rack:

1. Ensure that the inner part of each outer rail for the server is pushed all the way back into the rack.
2. At the front of the rack, align the rear of the inner rails on the server with the front of the outer rails on the rack.

## Step 5: Rack the HCP G11 Nodes

3. Fit each inner rail into the inside of the inner part of the corresponding outer rail. Then push the server back into the rack as far as the server goes.
4. While pushing back or pulling forward the purple tabs on the outsides of both inner rails on the server, push back on the server to release it. Then slide the server all the way back into the rack.



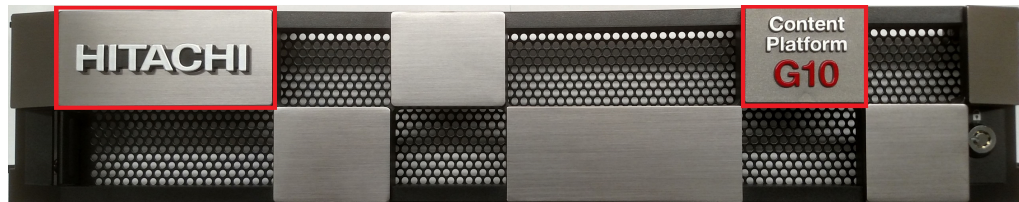
5. Using the #1 Phillips screwdriver, screw in the black locking screw below the handle on each side of the front of the server.





## Step 5e: Attach the labels to the front panel

The front panel for each server takes two labels — one that says "Hitachi" and one that identifies the product. You need to attach these labels to the front panel.



To attach the labels to the front panel:

1. Peel the protective backing off the back of the "Hitachi" label.
2. Position the "Hitachi" label in the middle of the upper left rectangle on the front of the panel.



3. Press the "Hitachi" label firmly into place.
4. Peel the protective backing off the back of the product label.
5. Place the product label on the upper righthand square on the front of the panel, aligning the four sides of the label with the edges of the square.



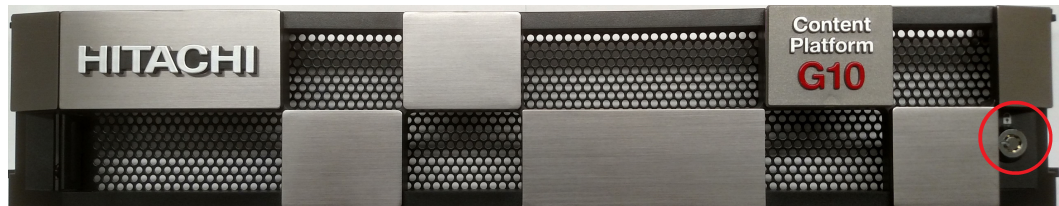
6. Press the product label firmly into place.

## Step 5f: Attach the front panel to the server

The front panel has two pins on either side that fit into holes in the server handles.

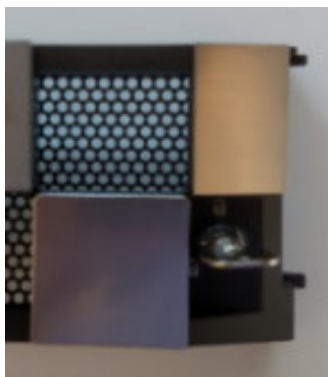


The front panel has a lock in the bottom right corner. The lock secures the panel to the server. Each panel comes with two keys. While the lock is unlocked, you cannot remove the key from it.



To attach the front panel to the server:

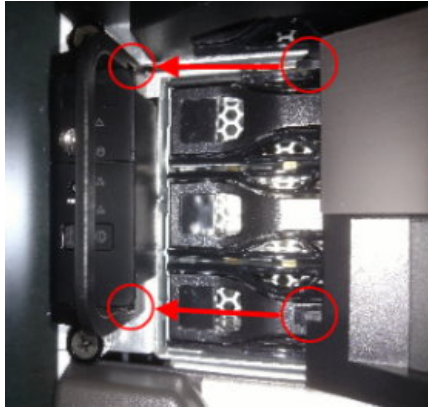
1. Insert one of the front panel keys into the front panel lock. The key goes into the lock horizontally.



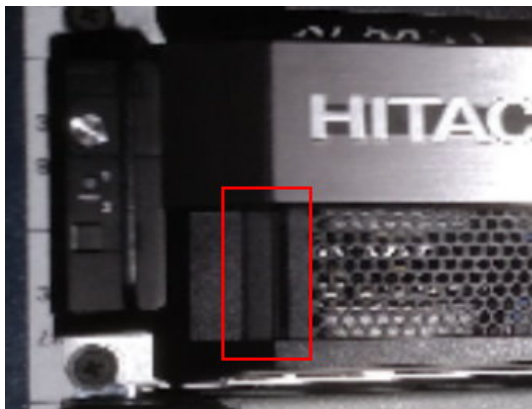
2. Turn the key one quarter turn clockwise so that the key is vertical.
3. Align the front panel with the front of the server.



4. Slide the two pins on the left side of the front panel into the two holes in the left server handle.



5. Press the tab on the front panel to the left to retract the pins on the right side of the panel.



6. While pressing the front panel against the server, release the tab so that the pins on the right side of the panel slide into the holes in the right server handle.
7. Pull gently on the right side of the front panel to ensure that pins on the right are set in the holes. If the right side of the panel moves away from the front of the server, perform step 6 again.
8. Turn the front panel key one quarter turn counterclockwise so that the key is horizontal.
9. Remove the key from the lock.
10. Store both front panel keys in a secure location.

## Step 5g: Connect the HCP G11 Nodes to the PDUs

Connect the power cables of the HCP G11 Nodes to the PDUs.

For more information about which PDU outlets to plug the power cables of the HCP G11 Nodes into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

## Step 5h: Install front-end connectivity options

You can order optional hardware to connect your HCP G11 Nodes to your internal network. Connect the switches to the front-end network based on the hardware you ordered.

## Step 6 (conditional): Rack the Fiber switches

If the HCP G11 system includes Fibre Channel switches, you need to rack the switches. If the HCP system does not use Fibre Channel switches, the HCP G11 Nodes are directly connected to the storage arrays.

HCP supports Brocade 6510 and Cisco MDS 9148s switches for Fibre Channel connections. Two Fibre Channel switches of the same model need to be installed in each rack for redundancy.

This section describes how to rack Fibre Channel switches and connect them to the PDUs.



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**Note:** When racking and mounting switches, this manual assumes you are using M5 caged nuts and screws. If you intend to use a different type of caged nut or screw, provide your own variant for the procedure.

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## Connecting HCP G11 Nodes to Fibre Channel switches or storage arrays

An HCP G11 system can use Fibre Channel switches when you need to connect more than eight server nodes to a single storage array or when you need to connect nodes to external storage arrays contained in separate racks. If the ordered HCP system has Fibre Channel switches included with the order, the switches need to be installed in positions U25 and U26 for every HCP G11 rack.

There are two types of Fibre Channel switches offered with the HCP G11 system, each with forty eight 16Gbps ports, the Brocade 6510 and the Cisco MDS 9148S. Follow the installation steps for the switch type included

in the order and mount them in all applicable racks. When finished, proceed to the fiber optic cabling section to connect the switches to the HCP G11 nodes and the storage arrays.

An HCP G11 system can also have the HCP G11 Nodes directly connected to the storage arrays without the use of Fibre Channel switches.

Based on whether or not Fibre Channel switches have been included in the order and what type of switches were included, select the appropriate racking and cabling section from the following table and follow the appropriate instructions.

Switch	More information
Direct connect between HCP G11 Nodes and storage arrays	<a href="#">"Fiber optic cabling between HCP G11 Nodes and storage arrays (direct connect)"</a> below
Racking the Brocade 6510	<a href="#">"Racking the Brocade 6510"</a> on page 74
Racking the Cisco MDS 9148	<a href="#">"Racking the Cisco MDS 9148S"</a> on page 85

### **Fiber optic cabling between HCP G11 Nodes and storage arrays (direct connect)**

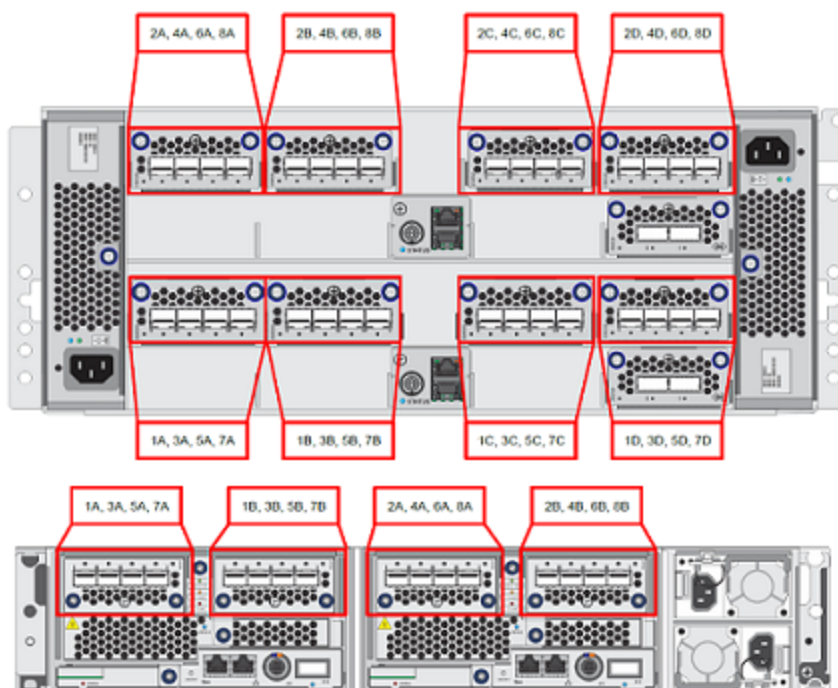
Follow the instructions outlined below to attach fiber optic jumper cables directly from HCP G11 Nodes to storage arrays. The HCP G11 Nodes and the storage arrays must be in the same rack in an Appliance configuration in order to set up a direct connection without Fibre Channel switches. You can connect up to eight HCP G11 Nodes to a storage array.

In order to cable the HCP G11 Nodes to storage arrays:

1. Select a 3m fiber optic jumper cable and locate the label sheet containing pairs of numbered decals.
2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
3. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the HCP G11 Nodes according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the HCP G11 Node (node#-port). The information presented in the following diagrams

## Step 5: Rack the HCP G11 Nodes

and tables applies to VSP-G storage arrays. If the storage array included on the order is not VSP-G, substitute the appropriate ports on the storage array for the ones shown in the table.



2 channel boards with CBSS/CBSL or DBL

Primary	Secondary
Storage array port 1A to Server Node 1, port 0	Storage array port 2A to Server Node 1, port 1
Storage array port 3A to Server Node 1, port 0	Storage array port 4A to Server Node 2, port 1
Storage array port 5A to Server Node 1, port 0	Storage array port 6A to Server Node 3, port 1
Storage array port 7A to Server Node 1, port 0	Storage array port 8A to Server Node 4, port 1

4 channel boards with CBSS/CBSL or DBL

Primary	Secondary
Storage array port 1A to Server Node 1, port 0	Storage array port 2A to Server Node 1, port 1
Storage array port 3A to Server Node 2, port 0	Storage array port 4A to Server Node 2, port 1
Storage array port 1B to Server Node 3, port 0	Storage array port 2B to Server Node 3, port 1
Storage array port 3B to Server Node 4, port 0	Storage array port 4B to Server Node 4, port 1

Below is an image of the back side of an HCP G11 Node with Attached Storage. The orange frames in the picture indicate the Fibre Channel ports. The Fibre Channel ports are in the same location for any other attached storage network configuration.

PRI denotes primary ports and SEC denotes secondary ports.



4. Repeat steps 1 through 3 for each cable to be connected between the storage array and the HCP G11 Nodes. The number of cables is always an even number and all HCP G11 Nodes have two connections. Not all ports on the array may be utilized and fewer than eight nodes may be present.
5. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable and render the path unusable.

## Racking the Brocade 6510

Brocade 6510 switches are Fibre Channel switches with 48 ports. 24 ports are active per switch. A pair of Brocade 6510 switches can connect up to sixteen HCPs.

Brocade 6510 switches are 1U switches. An HCP system comes with two Brocade 6510 switches per rack. Each switch takes up one rack unit. The switches should be mounted in rack units 25 and 26.

### Step 6a: Unpack the Brocade 6510

To unpack the Brocade 6510 switch:

1. Locate the following items in the switch container:
  - Brocade 6510 switch
  - Rack mounting kit
2. Provide the following items
3. Supply the following items (per switch):
  - Eight M5 racking screws
  - Eight M5 caged nuts
4. Locate the following items in separate packaging:
  - 8Gbps SFP optical transceivers
  - Power cables
5. Set the required items aside in an easy-to-reach location.
6. Leave the unused items in the switch container, and set the container aside.

The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

Do not discard the additional items. Pack them together and set them aside.

7. To install the SFP (small form factor pluggable) modules into the switch, remove the required number of SFPs (small form factor pluggable) from their packaging, observing standard static electricity protection measures.



8. Insert each SFP into the switch with the proper orientation. SFP orientation on the top row of ports is opposite from the bottom row of ports. Close the clasp latch by pushing it up and over the SFP, and gently insert the SFP into the port until it clicks in place.



#### **Step 6b: Install the Brocade 6510 rails**

To attach the rails to the Brocade 6510 switches:

1. Attach the inner pieces of the rail kit to each side of the switch using the three screws below.

## Step 5: Rack the HCP G11 Nodes



2. Attach the two mounting ears to the front sides of the switch (2 screws each).

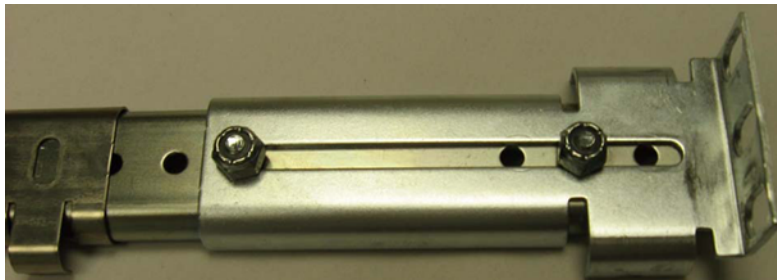


3. Install M5 caged nuts in all three square holes of U25 and U26 on the front of the rack on the left and right sides.
4. Use the top and bottom caged nuts on the left and right front of rack unit U25 to secure the back ends of the outer rails to the racks.





The image below is the back end of an outer rail. Mount the end at the front of the rack.



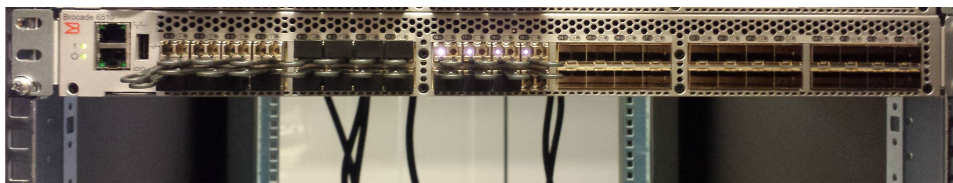
5. Repeat step 5 to secure the mounting rails for the switch to be mounted in rack position U26.

#### **Step 6c: Mount the Brocade 6510 into the rack**

To mount the switches in the racks:

1. Line up and slide the Brocade 6510 switch into the rails that are installed in the rack. Push the switch all the way into the rack.
2. Secure the port side of the switch using a screw in the middle square hole on both sides of rack unit U25.

## Step 5: Rack the HCP G11 Nodes



3. Repeat steps 1 and 2 for the other switch at rack unit U26.
4. Install two vented panels in the front of the rack at rack units U25 and U26 using M5 screws. The panels do not sit flush to the front of the rack since they are set on top of the screws for the mounting rail kit. Do not over-tighten the screws holding the perforated blanking panels.



### Step 6d: Connect the Brocade 6510 to the PDUs

Connect the power cables of the Brocade 6510 switches to the PDUs.

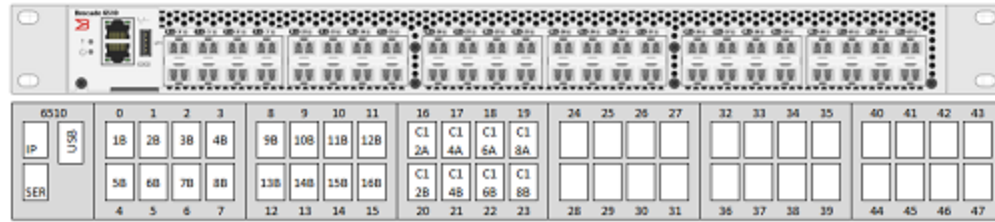
For more information about which PDU outlets to plug the power cables of the Brocade 6510 switches into, see [Step 5g: "Connect the HCP G11 Nodes to the PDUs"](#) on page 70.

### Step 6e: Brocade 6510 port diagram

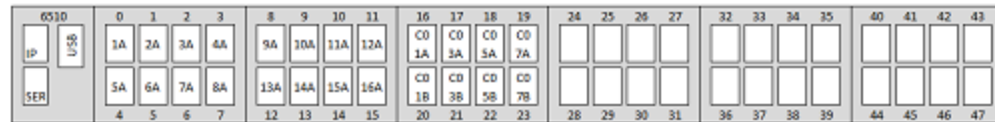
An HCP system with Fibre Channel switches includes the proper number of fiber optic jumper cables needed to connect the HCP G11 Nodes and the storage arrays to the Fibre Channel switches. The order includes labels that need to be applied to the ends of the fiber optic cables to identify them for support purposes.

Dedicate one set of jumper cables to connecting the HCP G11 Nodes to the top Fibre Channel switch, labeled *B*. Dedicate the other set of jumper cables to connecting the HCP G11 Nodes to the bottom Fibre Channel switch, labeled *A*. A third set of jumper cables is used to connect the Fibre Channel switches to the storage arrays.

The diagrams below show the port layout for connecting the HCP G11 Nodes and storage arrays to the Brocade 6510 Fibre Channel switches.



Brocade Fiber Channel Secondary Switch, located on U28



Brocade Fiber Channel Primary Switch, located on U27

exA = Server node number, primary port
exB = Server node number, secondary port
Cx xA = Controller x (0-1) primary port number (xA)
Cx xB = Controller x (0-1) secondary port number (xB)

There are two ports on the left side of the switches reserved for functions outside of communicating with the node and storage array. The ports are labeled:

- **SER** — the serial port used to set the initial configuration of the switch.
- **MGMT** — the Ethernet management port of the Fibre Channel switch used to configure the zoning on the switch.

Fibre Channel ports 1-16 on the switches are reserved for connections to the HCP G11 nodes. Fibre Channel ports 17-24 on the switches are reserved for connections to the storage arrays.

All connections between the HCP G11 Nodes and the Fibre Channel switches have redundant paths for fault tolerance. All connections between the storage arrays and the Fibre Channel switches have redundant paths across controllers for fault tolerance.

Only twenty-four of the ports on the switch are licensed by default. If you intend to connect more than one storage array to the switches, ensure the total number of ports required for the storage and servers does not exceed twenty-four. It's possible for the switches to be configured with additional port licenses to expand the number of available ports per switch, but this is generally not required.

**Step 6f: Cabling a Fibre Channel switch to a storage array**

Follow the instructions outlined below to attach fiber optic jumper cables between the Fibre Channel switches and the storage array.

1. If the HCP system being built is an Appliance configuration:
  - a. Select a 3 meter fiber optic jumper cable and locate the label sheet containing pairs of numbered decals.
  - b. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
  - c. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information in the following table applies to a VSP-G storage array. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to U25-P17	C1-P1A to U26-P17
C0-P0B to U25-P18	C1-P1B to U26-P18
C0-P0C to U25-P19	C1-P1C to U26-P19
C0-P0D to U25-P20	C1-P1D to U26-P20
C0-P0E to U25-P21	C1-P1E to U26-P21
C0-P0F to U25-P22	C1-P1F to U26-P22
C0-P0G to U25-P23	C1-P1G to U26-P23
C0-P0H to U25-P24	C1-P1H to U26-P24

- d. Repeat steps 1a through 1c for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables you connect is always be an even number, but you may not

use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.

- e. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.
2. If the HCP system being built is a Base/Expansion configuration:
    - a. Based on the number of storage arrays attached to the system, determine which HCP G11 nodes will be attached to which storage array. Divide the number of HCP G11 nodes by the number of storage arrays. Since there are sixteen HCP G11 Nodes per HCP rack, determine the number of storage arrays that will be connected to the Fibre Channel switches in each HCP rack. If the number of nodes plus half of the number of storage array ports exceeds twenty-four, stop and contact HCP Product Management or HCP Engineering for further instructions on cabling for this order.
    - b. Select a fiber optic jumper cable of the appropriate length to reach from the Fibre Channel switches in the HCP rack and the storage controllers in the separate storage rack. Also, locate the label sheet containing pairs of numbered decals.
    - c. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
    - d. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the list of port pairs shown in step 1c above. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information presented in the following table applies to VSP-G storage arrays. If the storage array included on the order is not VSP-G, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to U25-P17	C1-P1A to U26-P17
C0-P0B to U25-P18	C1-P1B to U26-P18
C0-P0C to U25-P19	C1-P1C to U26-P19
C0-P0D to U25-P20	C1-P1D to U26-P20
C0-P0E to U25-P21	C1-P1E to U26-P21
C0-P0F to U25-P22	C1-P1F to U26-P22
C0-P0G to U25-P23	C1-P1G to U26-P23
C0-P0H to U25-P24	C1-P1H to U26-P24

- e. Repeat steps 2b through 2d for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables is always an even number, but may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.
- f. If there is more than one array, repeat steps 2b through 2e for each storage array on the order.
- g. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.

### Step 6g: HCP G11 Node Fibre port diagram

An HCP G11 Node with attached storage has a primary Fibre Channel port and a secondary Fibre Channel port. Both of the ports are located on the HBA card. Before connecting them to the switches, make sure an SFP transceiver is present in both the primary and secondary Fibre Channel ports on each node.

The picture below shows a G11 Node with four 10G Base-T ports for the front-end and back-end Ethernet ports and two Fibre Channel ports. The orange frames in the picture below indicate the Fibre Channel ports. The Fibre Channel ports are in the same location for any other attached storage network configuration.

*PRI* denotes primary ports and *SEC* denotes secondary ports.



If the ordered HCP system has no Fibre Channel switches, the HCP G11 Nodes are cabled directly to the storage arrays. If the ordered HCP system has Fibre Channel switches, the HCP G11 Nodes are cabled to the Fibre Channel switches. Follow the cabling instructions in the appropriate section below for the HCP system you are building.

#### Step 6h: Cabling HCP G11 Nodes to Fibre Channel switches

Follow the instructions outlined below to attach fiber optic jumper cables between the HCP G11 Nodes and the Fibre Channel switches. All of the HCP G11 Nodes in a given rack are connected to the Fibre Channel switches in the same rack. Each HCP rack contains two Fibre Channel switches. To connect the nodes to the switches:

1. Select a 3 meter fiber optic jumper cable and locate the label sheet containing pairs of numbered decals.
2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
3. Attach one end of the fiber optic cable to a port on the Fibre Channel switch. Attach the other end of the cable to a port on one the HCP G11 Node according to the following list of port pairs. The pairs are defined as the port on the switch (rack position-port) and port on the HCP G11 Node (node#-port).

Primary	Secondary
U25-P01 to N01-PRI	U26-P01 to N01-SEC
U25-P02 to N02-PRI	U26-P02 to N02-SEC

(Continued)

Primary	Secondary
U25-P03 to N03-PRI	U26-P03 to N03-SEC
U25-P04 to N04-PRI	U26-P04 to N04-SEC
U25-P05 to N05-PRI	U26-P05 to N05-SEC
U25-P06 to N06-PRI	U26-P06 to N06-SEC
U25-P07 to N07-PRI	U26-P07 to N07-SEC
U25-P08 to N08-PRI	U26-P08 to N08-SEC
U25-P09 to N09-PRI	U26-P09 to N09-SEC
U25-P10 to N10-PRI	U26-P10 to N10-SEC
U25-P11 to N11-PRI	U26-P11 to N11-SEC
U25-P12 to N12-PRI	U26-P12 to N12-SEC
U25-P13 to N13-PRI	U26-P13 to N13-SEC
U25-P14 to N14-PRI	U26-P14 to N14-SEC
U25-P15 to N15-PRI	U26-P15 to N15-SEC
U25-P16 to N16-PRI	U26-P16 to N16-SEC

4. Repeat steps 1 through 3 for each cable to be connected between the Fibre Channel switches and the HCP G11 Nodes. The number of cables is always an even number and all HCP G11 Nodes have two connections. Not all ports on the switches may be utilized and fewer than sixteen nodes may be present.
5. If there are more than sixteen nodes in the HCP system, proceed to the second rack and repeat the process in steps 1 through 4 for the next set of HCP G11 Nodes. For each Expansion rack in the system, add sixteen to the node count shown in the table.
6. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this will damage the fiber optic cable and render the path unusable.



## Racking the Cisco MDS 9148S

Cisco MDS 9148S switches are Fibre Channel switches with 48 ports. 24 of the ports are active per switch. A pair of Cisco MDS 9148S switches can connect up to sixteen HCPs and up to sixteen storage array ports.

Cisco MDS 9148S switches are 1U switches. An HCP system comes with two Cisco MDS 9148S switches per rack. Each switch takes up one rack unit. The switches should be mounted in rack units 25 and 26.

### Step 6a: Unpack the Cisco MDS 9148S

To unpack the Cisco MDS 9148S switch:

1. Locate the following items in the switch container:
  - Cisco MDS 9148 switch
  - Rack mounting kit
2. Supply the following items (per switch):
  - Eight M5 racking screws
  - Eight M5 caged nuts
3. Locate the following items in separate packaging:
  - 8Gbps SFP optical transceivers
  - Power cables
4. Set the required items aside in an easy-to-reach location.
5. Leave the unused items in the switch container, and set the container aside.

The rest of items included in the switch container are not necessary for the installation. You do not need the original power cords for the switches.

Do not discard additional items. Pack them together and set them aside.

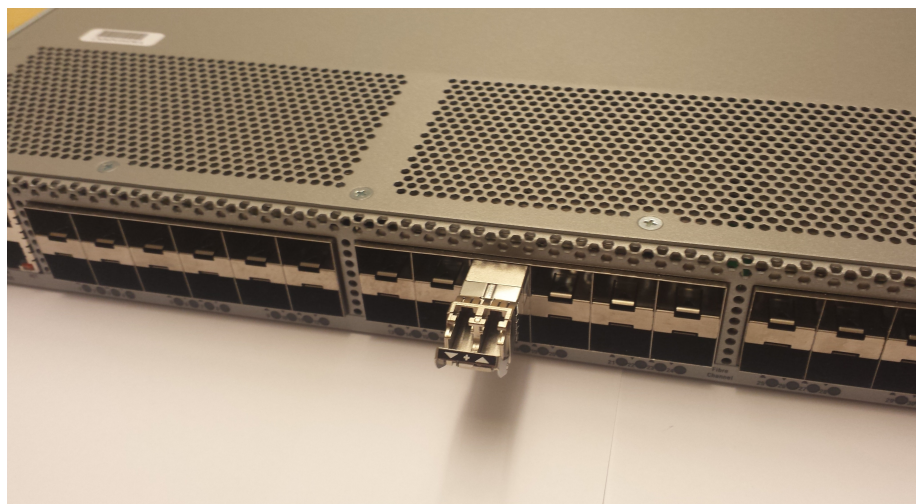
6. To install the SFP (small form factor pluggable) modules into the switch, remove the required number of SFPs from their packaging, observing standard static electricity protection measures.

## Step 5: Rack the HCP G11 Nodes

The number of required SFP transceivers per switch is the number of server nodes plus eight for each storage array. The Cisco SFPs may be packed in individual static bags instead of the packaging shown below.



7. Insert each SFP into the switch with the proper orientation. SFP orientation on the top row of ports is the opposite of the bottom row of ports. Close the clasp latch by pushing it up and over the SFP, and gently insert the SFP into the port until it clicks in place.



**Important:** Be gentle when inserting the modules. The switches are fragile.

### Step 6b: Install the Cisco MDS 9148S mounting rails

To attach rails to the switches and install the outer rails:

1. Attach the two mounting ears to the front sides of the switch using the three M4 screws that came with each bracket.



2. Attach the rear mounting bracket to the switch using M4 screws provided with the mounting kit.
3. On the front side of the rack, install three M5 caged nuts (from the rack accessory kit) in the top, middle, and bottom square holes of the left and right sides of U25 and U26.
4. On the rear side of the rack, install two M5 caged nuts (from the rack accessory kit) in the top and bottom square holes of the left and right sides of U25 and U26.
5. Connect the two long halves of the mounting rail kits to the front of the rack using two M5 screws per bracket as shown in the following image.



### Step 6c: Mount the Cisco MDS 9148 into the rack

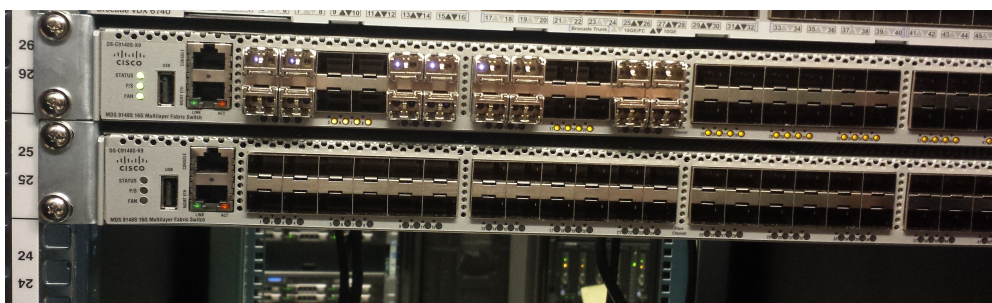
To mount the Cisco MDS 9148 switches in the rack:

1. Slide the Cisco switch into the rack unit that has the mounting brackets on the front side. Make sure the 'C' shaped brackets attached to the sides of the switch properly catch on the mounting rails inside the rack.



**Note:** When inserting the Cisco switch into the rack, make sure the ports for Ethernet and Fibre channel switches face the rear of the rack.

2. Slide the switch all the way in, and secure it to the rear vertical EIA rails using two M5 screws on the top and bottom square holes of each side of the switch.



3. Install two vented panels in the front of the rack at rack units U25 and U26 using M5 screws. The panels do not sit flush to the front of the rack since they are set on top of the screws for the mounting rail kit. Do not over-tighten the screws holding the perforated blanking panels.



### Step 6d: Connect the Cisco MDS 9148S switches to the PDUs

Connect the power cables of the Cisco MDS 9148S switches to the PDUs.

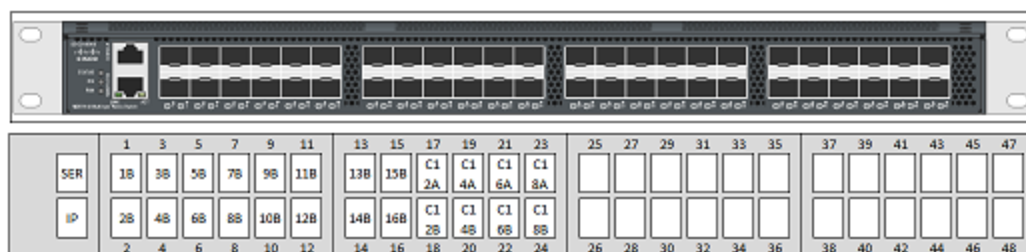
For more information about which PDU outlets to plug the power cables of the Cisco MDS 9148S into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

### Step 6e: Cisco MDS 9148S port diagram

An HCP system with Fibre Channel switches includes the proper number of fiber optic jumper cables needed to connect the HCP G11 Nodes and the storage arrays to the Fibre Channel switches. The order includes labels to that need to be applied to the ends of the fiber optic cables to identify them for support purposes.

Dedicate one set of jumper cables to connecting the HCP G11 Nodes to the top Fibre Channel switch, labeled *B*. Dedicate the other set of jumper cables to connecting the HCP G11 Nodes to the bottom Fibre Channel switch, labeled *A*. A third set of jumper cables is used to connect the Fibre Channel switches to the storage arrays.

The diagrams below show the port layout for connecting the HCP G11 Nodes and storage arrays to the Cisco MDS 9148S Fibre Channel switches.



Fibre Channel ports 1-16 on the switches are reserved for connections to the HCP G11 nodes. Fibre Channel ports 17-24 on the switches are reserved for connections to the storage arrays.

All connections between the HCP G11 Nodes and the Fibre Channel switches have redundant paths for fault tolerance. All connections between the storage arrays and the Fibre Channel switches have redundant paths across controllers for fault tolerance.

Only twenty-four of the ports on the switch are licensed by default. If you intend to connect more than one storage array to the switches, ensure the total number of ports required for the storage and servers does not exceed twenty-four. It's possible for the switches to be configured with additional port licenses to expand the number of available ports per switch, but this is generally not be required.

### **Step 6f: Cabling a Fibre Channel switch to a storage array**

Follow the instructions outlined below to attach fiber optic jumper cables between the Fibre Channel switches and the storage array.

- 1.** If the HCP system being built is an Appliance configuration:
  - a.** Select a 3 meter fiber optic jumper cable and locate the label sheet containing pairs of numbered decals.
  - b.** Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
  - c.** Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information in the following table applies to a VSP-G storage array. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to U25-P17	C1-P1A to U26-P17
C0-P0B to U25-P18	C1-P1B to U26-P18
C0-P0C to U25-P19	C1-P1C to U26-P19
C0-P0D to U25-P20	C1-P1D to U26-P20
C0-P0E to U25-P21	C1-P1E to U26-P21
C0-P0F to U25-P22	C1-P1F to U26-P22
C0-P0G to U25-P23	C1-P1G to U26-P23
C0-P0H to U25-P24	C1-P1H to U26-P24

- d. Repeat steps 1a through 1c for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables you connect is always be an even number, but you may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.
  - e. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.
2. If the HCP system being built is a Base/Expansion configuration:
    - a. Based on the number of storage arrays attached to the system, determine which HCP G11 nodes will be attached to which storage array. Divide the number of HCP G11 nodes by the number of storage arrays. Since there are sixteen HCP G11 Nodes per HCP rack, determine the number of storage arrays that will be connected to the Fibre Channel switches in each HCP rack. If the number of nodes plus half of the number of storage array ports exceeds twenty-four, stop and contact HCP Product Management or HCP Engineering for further instructions on cabling for this order.
    - b. Select a fiber optic jumper cable of the appropriate length to reach from the Fibre Channel switches in the HCP rack and the storage controllers in the separate storage rack. Also, locate the label sheet containing pairs of numbered decals.



- c. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
- d. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the list of port pairs shown in step 1c above. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information presented in the following table applies to VSP-G storage arrays. If the storage array included on the order is not VSP-G, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to U25-P17	C1-P1A to U26-P17
C0-P0B to U25-P18	C1-P1B to U26-P18
C0-P0C to U25-P19	C1-P1C to U26-P19
C0-P0D to U25-P20	C1-P1D to U26-P20
C0-P0E to U25-P21	C1-P1E to U26-P21
C0-P0F to U25-P22	C1-P1F to U26-P22
C0-P0G to U25-P23	C1-P1G to U26-P23
C0-P0H to U25-P24	C1-P1H to U26-P24

- e. Repeat steps 2b through 2d for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables is always an even number, but may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.
- f. If there is more than one array, repeat steps 2b through 2e for each storage array on the order.
- g. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.



**Step 6g: HCP G11 Node Fibre port diagram**

An HCP G11 Node with attached storage has a primary Fibre Channel port and a secondary Fibre Channel port. Both of the ports are located on the HBA card. Before connecting them to the switches, make sure an SFP transceiver is present in both the primary and secondary Fibre Channel ports on each node.

The picture below shows a G11 Node with four 10G Base-T ports for the front-end and back-end Ethernet ports and two Fibre Channel ports. The orange frames in the picture below indicate the Fibre Channel ports. The Fibre Channel ports are in the same location for any other attached storage network configuration.

*PRI* denotes primary ports and *SEC* denotes secondary ports.



If the ordered HCP system has no Fibre Channel switches, the HCP G11 Nodes are cabled directly to the storage arrays. If the ordered HCP system has Fibre Channel switches, the HCP G11 Nodes are cabled to the Fibre Channel switches. Follow the cabling instructions in the appropriate section below for the HCP system you are building.

**Step 6h: Cabling HCP G11 Nodes to Fibre Channel switches**

Follow the instructions outlined below to attach fiber optic jumper cables between the HCP G11 Nodes and the Fibre Channel switches. All of the HCP G11 Nodes in a given rack are connected to the Fibre Channel switches in the same rack. Each HCP rack contains two Fibre Channel switches. To connect the nodes to the switches:

1. Select a 3 meter fiber optic jumper cable and locate the label sheet containing pairs of numbered decals.

2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.
3. Attach one end of the fiber optic cable to a port on the Fibre Channel switch. Attach the other end of the cable to a port on one the HCP G11 Node according to the following list of port pairs. The pairs are defined as the port on the switch (rack position-port) and port on the HCP G11 Node (node#-port).

Primary	Secondary
U25-P01 to N01-PRI	U26-P01 to N01-SEC
U25-P02 to N02-PRI	U26-P02 to N02-SEC
U25-P03 to N03-PRI	U26-P03 to N03-SEC
U25-P04 to N04-PRI	U26-P04 to N04-SEC
U25-P05 to N05-PRI	U26-P05 to N05-SEC
U25-P06 to N06-PRI	U26-P06 to N06-SEC
U25-P07 to N07-PRI	U26-P07 to N07-SEC
U25-P08 to N08-PRI	U26-P08 to N08-SEC
U25-P09 to N09-PRI	U26-P09 to N09-SEC
U25-P10 to N10-PRI	U26-P10 to N10-SEC
U25-P11 to N11-PRI	U26-P11 to N11-SEC
U25-P12 to N12-PRI	U26-P12 to N12-SEC
U25-P13 to N13-PRI	U26-P13 to N13-SEC
U25-P14 to N14-PRI	U26-P14 to N14-SEC
U25-P15 to N15-PRI	U26-P15 to N15-SEC
U25-P16 to N16-PRI	U26-P16 to N16-SEC

4. Repeat steps 1 through 3 for each cable to be connected between the Fibre Channel switches and the HCP G11 Nodes. The number of cables is always an even number and all HCP G11 Nodes have two connections. Not all ports on the switches may be utilized and fewer than sixteen nodes may be present.

5. If there are more than sixteen nodes in the HCP system, proceed to the second rack and repeat the process in steps 1 through 4 for the next set of HCP G11 Nodes. For each Expansion rack in the system, add sixteen to the node count shown in the table.
6. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this will damage the fiber optic cable and render the path unusable.

## Step 7: Rack the Ethernet Switches

The Ethernet switches described in this section are all back-end switches. You are responsible for providing front-end network connectivity to the HCP G11 Nodes and optional HCP S10 Nodes. When you rack the Ethernet switches, the Ethernet switches need to be installed facing the back of the racks. When mounting a pair of switches, mount the lower one first and the upper one second.



**Note:** When racking and mounting switches, this manual assumes you are using M5 caged nuts and screws. If you intend to use a different type of caged nut or screw, provide your own variant for the procedure.

There are five possible back-end Ethernet switches that can be ordered with an HCP system. Choose the switch ordered from the following table and proceed to that section for racking, cabling, and configuration instructions.

Switch Type	Installation and cabling instructions
Brocade ICX6430 (1G)	<a href="#">"Racking the Brocade ICX 6430"</a> below
Brocade VDX6740 (10G)	<a href="#">"Racking the Brocade VDX 6740"</a> on page 102
Cisco Nexus switches (10G)	<a href="#">"Racking a Cisco Nexus switch"</a> on page 111
Extreme 210 (10G)	<a href="#">"Racking the Extreme 210"</a> on page 134

### Racking the Brocade ICX 6430

Brocade ICX 6430 switches are 1G Ethernet switches which come with 24 or 48 ports per switch. A pair of Brocade ICX 6430-24 switches can connect up to 22 HCPs. A pair of ICX 6430-48 switches can connect up to 44 HCPs.

## Step 7: Rack the Ethernet Switches

Each switch takes up one rack unit. The switches are mounted in rack positions U25 and U26.

Items you need to rack the Ethernet switches include:

- #1 and #2 Phillips screwdrivers
- Caged-nut insertion and removal tool

### Step 7a: Unpack the Brocade ICX 6430

To unpack the Brocade ICX 6430 switch:

1. Locate the following items in the switch container:
  - Brocade ICX 6430 switch
  - Rack mounting kit containing two L-shaped mounting brackets and #6 flat-head screws.
2. Supply the following items (per switch):
  - Four racking screws
  - Four Caged nuts
3. Set the required items aside in an easy-to-reach location.
4. Leave the unused items in the switch container, and set the container aside.

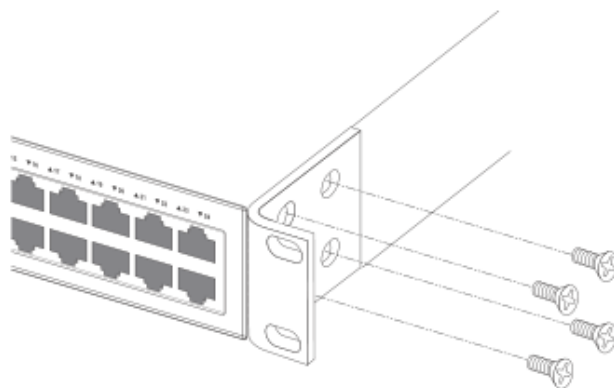
The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

Do not discard additional items. Pack them together and set them aside.

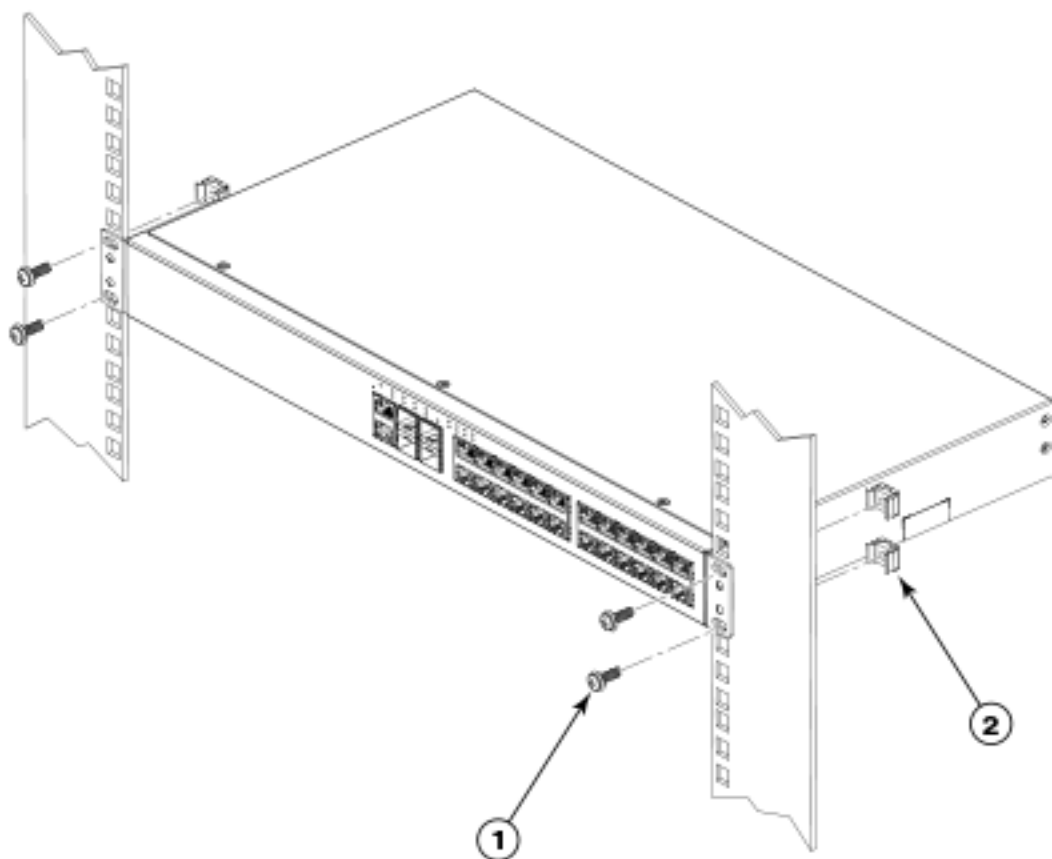
### Step 7b: Mount the Brocade ICX 6430 in the rack

To mount the Brocade ICX 6430 switches into the rack:

1. Using a #2 Phillips screwdriver, attach the L shaped mounting brackets to the sides of the device using four flat-head screws provided in the kit.



2. Insert four caged nuts in the top and bottom square holes on the left and right sides of the rear of the rack in position U25.
3. Using a #2 Phillips screwdriver, mount the device in a two-post rack using four rack-mounting screws for each switch.



4. Repeat steps 1 through 3 to install the other Brocade ICX 6430 switch into rack position U26.
5. Install two venting panels in the front of the rack in positions U25 and U26. Insert a single caged nut in the center square hole of the left and right side of the rack at positions U25 and U26. Use rack mounting screws to secure the perforated blanking panels to the front of the rack.



### Step 7c: Connect the Brocade ICX 6430 switches to the PDUs

Connect the power cables of the Brocade ICX 6430 switches to the PDUs.

For more information about which PDU outlets to plug the power cables of the Brocade ICX 6430 switches into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

### Step 7d: HCP G11 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430), the HCP G11 Node Ethernet ports can be set up for two different 1GbE back-end configurations. The pictures below show both of the possible ways to configure Ethernet ports on a HCP G11 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections, ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches. The port with the purple frame is the management port.



**Note:** The purple port should not be used unless you are configuring the system to have a [hcp\_management] network.

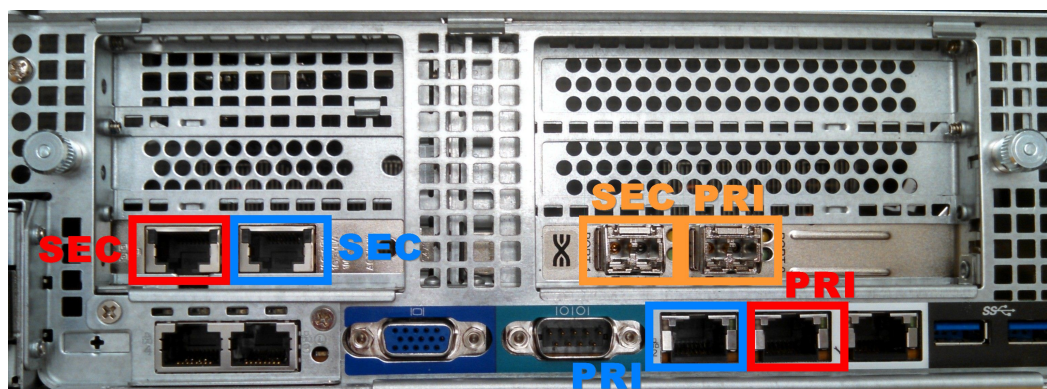


The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U25. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U26.

The following image shows an HCP G11 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX 6430 switch.



The following image shows an HCP G11 Node with 10G BASE-T ports for back-end connection and 10G SFP+ ports for the front-end connection. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX643 switch.



The bonding of the ports on the back-end Ethernet networking are different for the two configurations. Pay close attention to the network configuration when performing the Ethernet cabling.

## Step 7e: Brocade ICX 6430 port diagram

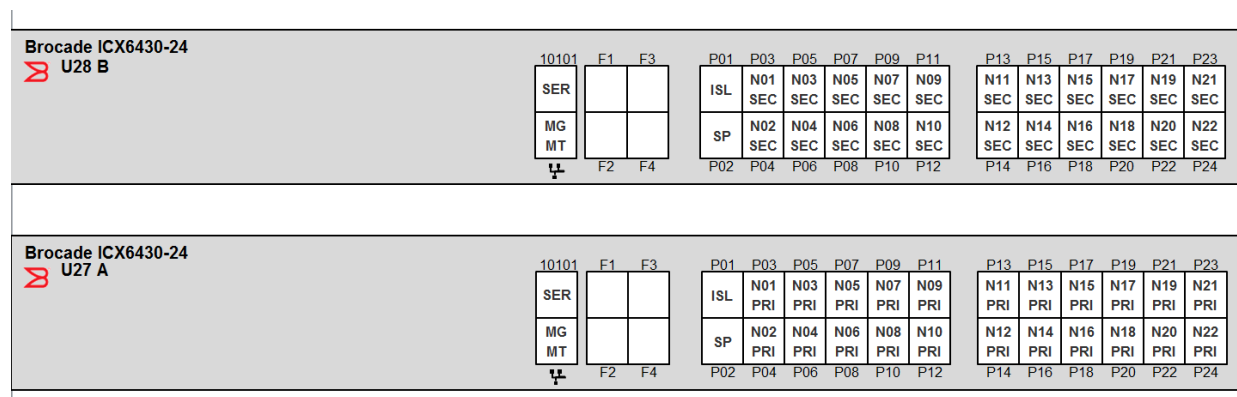
An HCP system comes with all the CAT-6 cable harnesses needed to connect the ordered number of nodes to the switch. The system comes with one or more red and one or more blue Ethernet cable harness when the Brocade ICX 6430 switches are included. In order to connect the cables to the Brocade ICX 6430 back-end network switches, follow the instructions below.

The red cable harnesses are devoted exclusively to the Brocade ICX 6430 switch in rack position U25. The blue cable harnesses are devoted exclusively to the Brocade ICX 6430 switch in rack position U26.

The diagrams below show the port configuration for the Brocade ICX 6430-24 switches and the Brocade ICX 6430-48 switches. In each type of switch, four ports reserved for functions outside of communicating with the nodes. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

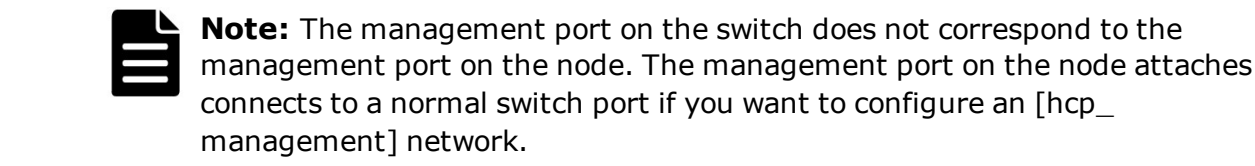
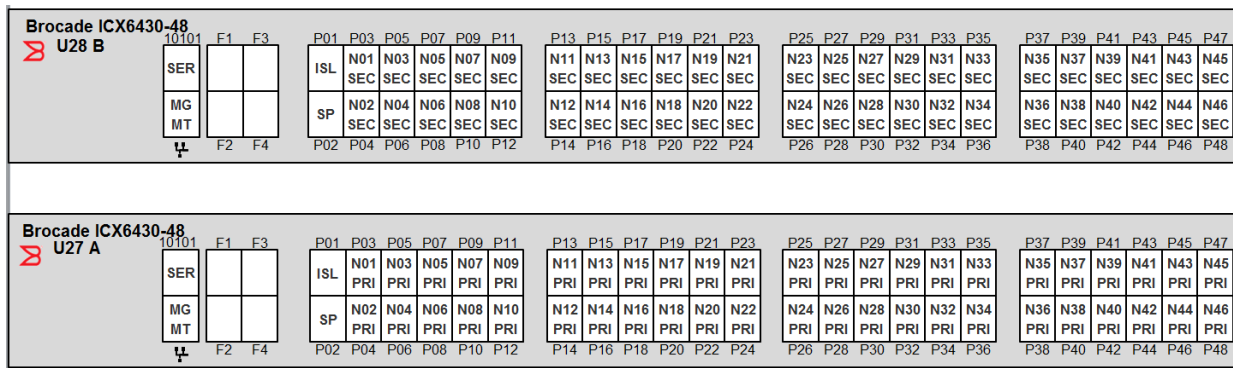
- **SER** — the serial port used to configure the switch
- **MGMT** — the management port used to configure the switch
- **ISL** — the inter-switch link used to connect the two back-end switches to one another, which was already attached.
- **SP** — the service port used by Hitachi Vantara service personnel in the field.


The following image shows the Brocade ICX6430-24 port diagram.





The following image shows the Brocade ICX6430-48 port diagram.



 **Note:** The management port on the switch does not correspond to the management port on the node. The management port on the node attaches connects to a normal switch port if you want to configure an [hcp\_ management] network.

## Step 7f: Connect the Brocade ICX 6430 Ethernet cables

To connect the Ethernet cables to their respective ports:

- 1.** Locate the purple one foot CAT-6 Ethernet cable (541-145-001.P) and connect it from port 1 on the switch in position U25 to port 1 on the switch in position U26.
- 2.** Locate one red and one blue Ethernet cable harness. The first two CAT-6 cable harnesses are 7 feet in length. If there is a third set of cable harnesses, the harnesses are 25 feet in length and are used for nodes 17 through 22.
- 3.** Connect the short end of the red cable harness cables to the Brocade ICX 6430 switch in rack position U25. Connect cables 01 through 08 to the proper ports on the switch corresponding to node numbers 1 through 8.
- 4.** Connect the short end of the blue cable harness cables to the Brocade ICX 6430 switch in rack position U26. Connect cables 01 through 08 to the proper ports on the switch corresponding to node numbers 1 through 8.
- 5.** Tie off the short end of the remaining red and blue cables (cables 09-12 and EXTRA) neatly.

6. Connect the long end of the red cable harness cables to Nodes 1 through 8 using the back-end network port marked PRI. Not all of the cables are used if the number of nodes is less than eight.
7. Connect the long end of the blue cable harness cables to Nodes 1 through 8 using the back-end network port marked SEC. Not all of the cables are used if the number of nodes is less than eight.
8. Tie off the long end of the remaining red and blue cables (cables 09-12, EXTRA, and any other unused cables) neatly.
9. Attach the cable harnesses to the cable management trays at the rear of the rack on the left or right side of the rack.
10. If there are more than eight nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by eight.
11. If there are more than sixteen nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by sixteen.

## Racking the Brocade VDX 6740

Brocade VDX 6740 switches are 10G Ethernet switches with 48 ports per switch. A pair of Brocade VDX 6740 switches can connect up to 44 HCPs. Each switch takes up one rack unit. The switches are mounted in rack positions U25 and U26.

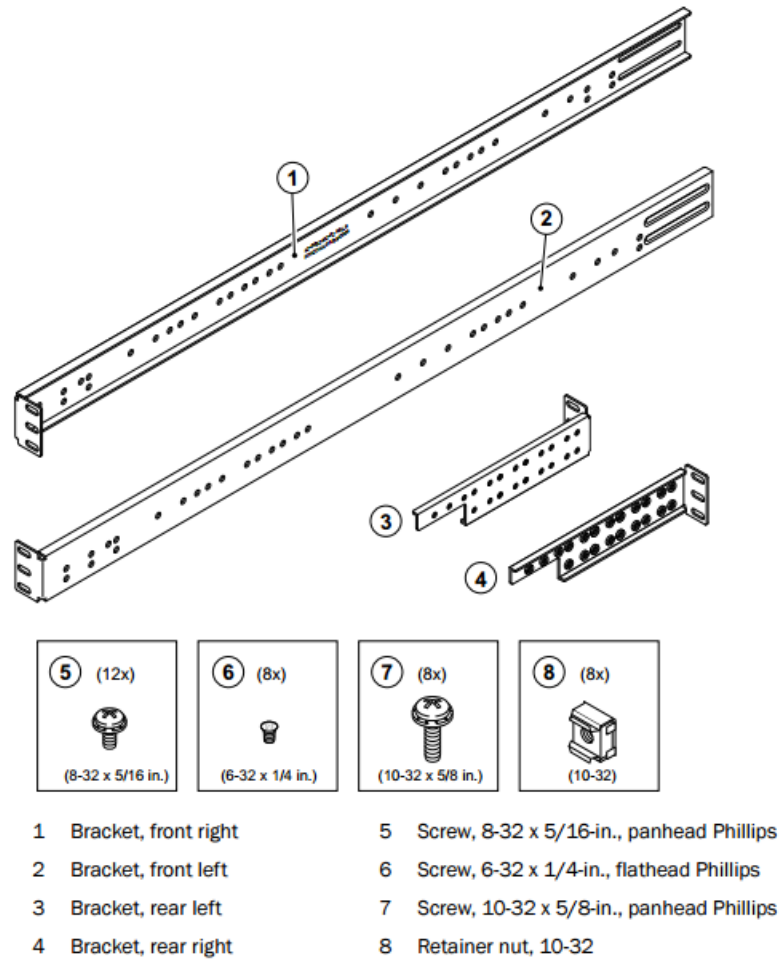
Items you will need to rack the Ethernet switches include:

- #1 and #2 Phillips screwdrivers
- Caged-nut insertion and removal tool

### Step 7a: Unpack the Brocade VDX 6740

To unpack the Brocade VDX 6740 switch:

1. Unpack the following items in the switch container:
  - Brocade VDX 6740 switch
  - Serial cable for Brocade switches
2. Locate the four-post fixed rack mount kit (24 inch-32 inch), containing the items shown in the following figure.



**3.** Supply the following items (per switch):

- Eight M5 caged nuts
- Eight M5 screws

**4.** Locate a single 10G SFP+ to 1G RJ-45 adapter module, Brocade part number XBR-000190.P.

**5.** Set the required items aside in an easy-to-reach location.

**6.** Leave the unused items in the switch container, and set the container aside.

The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

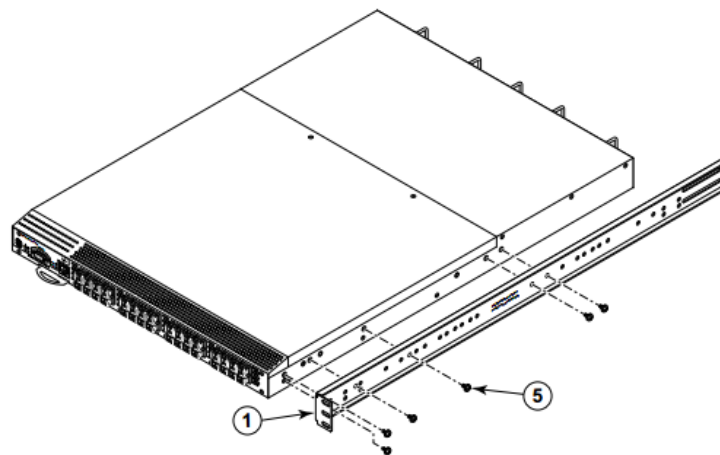
## Step 7: Rack the Ethernet Switches

Do not discard additional items. Pack them together and set them aside.

### Step 7b: Install the Brocade VDX 6740 rails

To install Brocade VDX 6740 rails:

1. Position the front right bracket with the flat side against the right side of the switch. Make sure to have the back half of the rail is detached.



- 1 Bracket, front right
- 5 Screw, 8-32 x 5/16-in., panhead Phillips

2. Screw five 8-32 x 5/16-inch screws into the holes in the bracket.



3. Repeat the previous steps to attach the front left bracket to the left side of the switch.
4. Tighten all of the 8-32 x 5/16-inch screws to a torque of 15 in-lbs. (17 cm-kgs).

### Step 7c: Mount the Brocade VDX 6740 in the rack

To mount the Brocade VDX 6740 in the rack:

1. Set the M5 caged nuts in all three positions in U25 (switch A) and U26 (switch B) on both sides in the front of the rack. Use the caged nuts from the rack accessory kit, not the ones from the Brocade rail kit.
2. On the rear side of the rack, install caged nuts in the top and bottom positions in U25 and U26 on the left and right side of the rack. Use the caged nuts from the rack accessory kit, not the ones from the Brocade rail kit.
3. Position the switch in the rear cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.
4. Attach the left and right rails of the switch into the rear of the rack by screwing two screws into the caged nuts on the left and right. Use the screws from the rack accessory kit, not the screws from the Brocade rail kit.

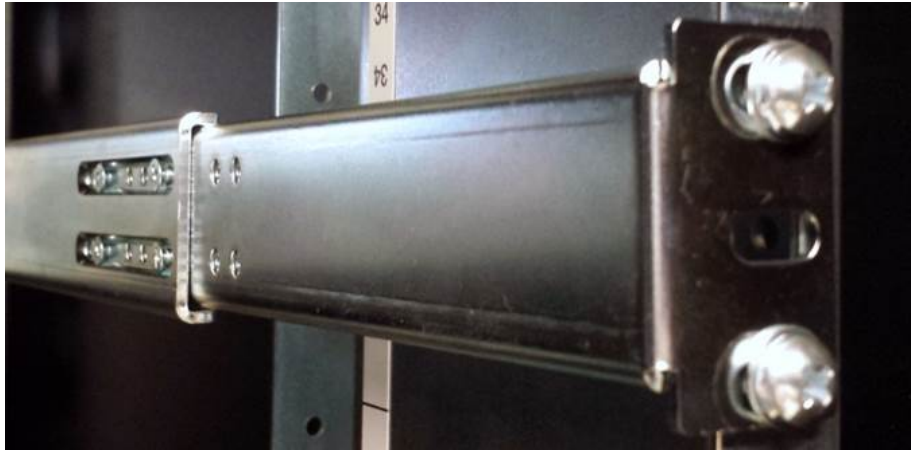


5. Once the four rear screws have been secured, you should be able move to the front of the cabinet to secure the rear of the rails. Position the right rear bracket inside the right front bracket and install two rack screws to hold it to the front of the rack. Repeat the process for the left rear bracket.

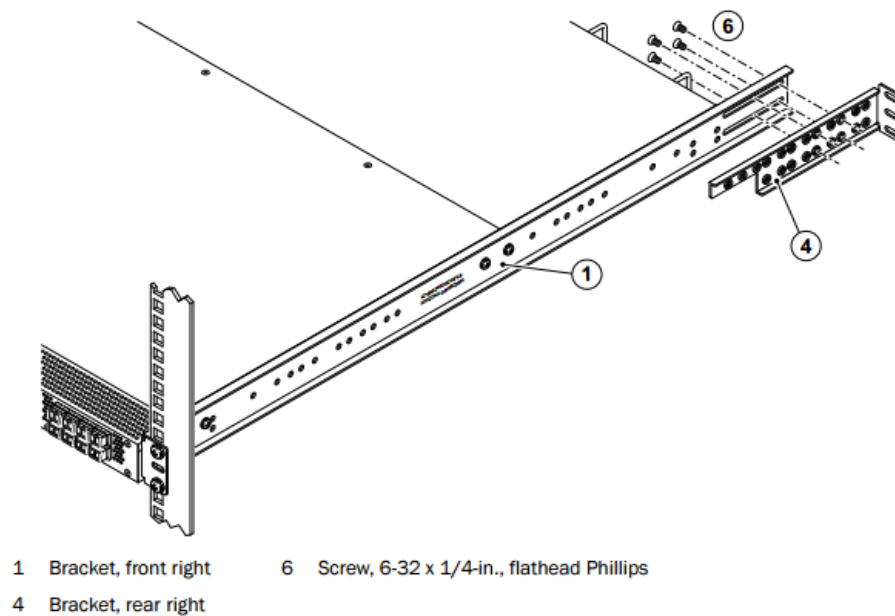


**Important:** If the rails do not appear to be secure, get help keeping them in place until they have been tightened.

## Step 7: Rack the Ethernet Switches



6. Attach the brackets using four 6-32 x 1/4-inch screws.



7. Install two vented panels in the front of the rack in rack units U25 and U26.



### Step 7d: Connect the Brocade VDX 6740 switches to the PDUs

Connect the power cables of the Brocade VDX 6740 switches to the PDUs.

For more information about which PDU outlets to plug the power cables of the Brocade VDX 6740 switches into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

### Step 7e: Install the SFP+ to RJ-45 adapter

Insert the 10G SFP+ to 1G RJ-45 adapter module into port 03 of the lower of the two switches.



### Step 7f: HCP G11 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430), the HCP G11 Node Ethernet ports can be set up for two different 1GbE back-end configurations. The pictures below show both of the possible ways to configure Ethernet ports on a HCP G11 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections, ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches. The port with the purple frame is the management port.



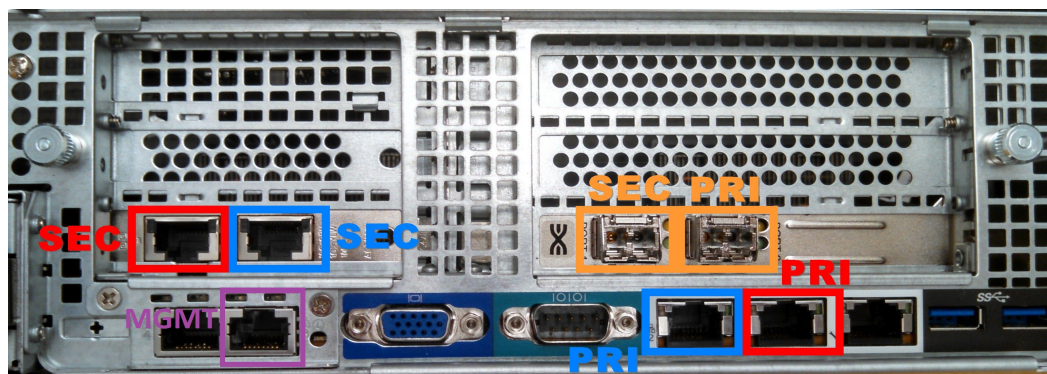
**Note:** The purple port should not be used unless you are configuring the system to have a [hcp\_management] network.



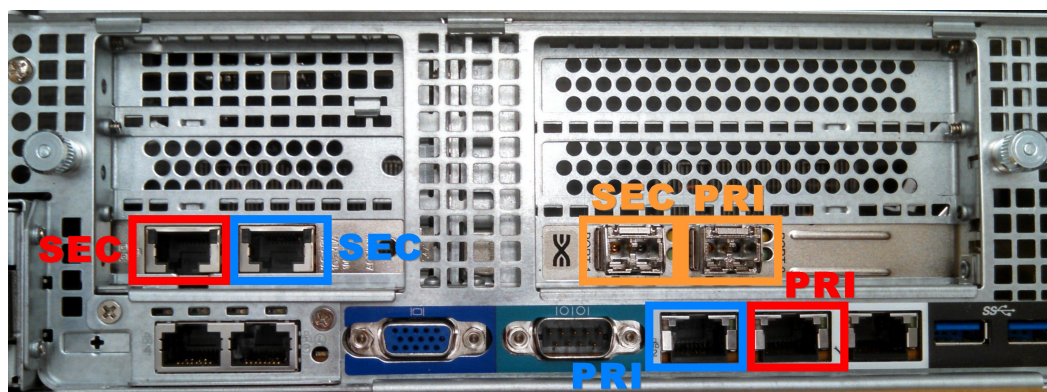
## Step 7: Rack the Ethernet Switches

The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U25. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U26.

The following image shows an HCP G11 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX 6430 switch.



The following image shows an HCP G11 Node with 10G BASE-T ports for back-end connection and 10G SFP+ ports for the front-end connection. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX643 switch.



The bonding of the ports on the back-end Ethernet networking are different for the two configurations. Pay close attention to the network configuration when performing the Ethernet cabling.



### Step 7g: Brocade VDX 6740 port diagram

An HCP system comes with all the Twinax cables needed to connect the ordered number of nodes to the switches. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax cables.



**Note:** Twinax cables from Brocade and Cisco are not compatible with one another. Please ensure you only use the vendor specific cables with the switches.

The diagrams below show six ports reserved for functions outside of communicating with the HCP Nodes. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

- **SER** — the serial port used to configure the switch.
- **MGMT** — the management port used to configure the switch.
- **ISL** — the inter-switch link used to connect the two back-end switches to one another.
- **SP** — the service port used by Hitachi Vantara service personnel.
- **R** — the port is reserved.

Brocade VDX6740										U28 B																			
10101	P01	P03	P05	P07	P09	P11	P13	P15		P17	P19	P21	P23	P25	P27	P29	P31		P33	P35	P37	P39	P41	P43	P45	P47		P49-52	P57-60
SER	ISL	SP	N01 SEC	N03 SEC	N05 SEC	N07 SEC	N09 SEC	N11 SEC		N13 SEC	N15 SEC	N17 SEC	N19 SEC	N21 SEC	N23 SEC	N25 SEC	N27 SEC		N29 SEC	N31 SEC	N33 SEC	N35 SEC	N37 SEC	N39 SEC	N41 SEC	N43 SEC			
MG			N02 SEC	N04 SEC	N06 SEC	N08 SEC	N10 SEC	N12 SEC		N14 SEC	N16 SEC	N18 SEC	N20 SEC	N22 SEC	N24 SEC	N26 SEC	N28 SEC		N30 SEC	N32 SEC	N34 SEC	N36 SEC	N38 SEC	N40 SEC	N42 SEC	N44 SEC			
MT	ISL	R	SEC	SEC	SEC	SEC	SEC	SEC		SEC	SEC	SEC	SEC	SEC	SEC	SEC	SEC		SEC	SEC	SEC	SEC	SEC	SEC	SEC	SEC			
	P02	P04	P06	P08	P10	P12	P14	P16		P18	P20	P22	P24	P26	P28	P30	P32		P34	P36	P38	P40	P42	P44	P46	P48		P53-56	P61-64

		Brocade VDX6740																U27 A																	
		10101	P01	P03	P05	P07	P09	P11	P13	P15	P17	P19	P21	P23	P25	P27	P29	P31	P33	P35	P37	P39	P41	P43	P45	P47	P49-52	P57-60							
<input checked="" type="radio"/>	SER		ISL	SP	N01 PRI	N03 PRI	N05 PRI	N07 PRI	N09 PRI	N11 PRI	N13 PRI	N15 PRI	N17 PRI	N19 PRI	N21 PRI	N23 PRI	N25 PRI	N27 PRI	N29 PRI	N31 PRI	N33 PRI	N35 PRI	N37 PRI	N39 PRI	N41 PRI	N43 PRI									
<input type="radio"/>	MG		ISL	R	N02 PRI	N04 PRI	N06 PRI	N08 PRI	N10 PRI	N12 PRI	N14 PRI	N16 PRI	N18 PRI	N20 PRI	N22 PRI	N24 PRI	N26 PRI	N28 PRI	N30 PRI	N32 PRI	N34 PRI	N36 PRI	N38 PRI	N40 PRI	N42 PRI	N44 PRI									
<input type="radio"/>	MT																																		
			P02	P04	P06	P08	P10	P12	P14	P16	P18	P20	P22	P24	P26	P28	P30	P32	P34	P36	P38	P40	P42	P44	P46	P48	P53-56	P61-64							



**Note:** The management port on the switch does not correspond to the management port on the node. The management port on the node attaches connects to a normal switch port if you want to configure an [hcp\_management] network.

## Step 7h: Connect the Brocade VDX 6740 Ethernet cables

To connect the cables to the ports:

1. Locate two one meter Brocade Twinax cables. Connect the first cable from port 1 on the switch in position U25 to port 1 on the switch in position U26. Connect the second cable from port 2 on the switch in position U25 to port 2 on the switch in position U26.
2. Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the Brocade VDX 6740 switches in the Base or Appliance rack to the HCP Nodes. If there are five meter Twinax cables, they are used to connect nodes 17-44 in the Expansion racks to the back-end switches in the Base rack.
3. Locate the label sheets containing pairs of numbered decals.
4. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.
5. Connect one end of the Twinax cable to the Brocade VDX 6740 switch in rack position U25 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.
6. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.
7. Connect one end of the Twinax cable to the Brocade VDX 6740 switch in rack position U26 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.
8. Repeat steps 3 through 6 for each of the nodes in the Appliance or Base rack.
9. Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.
10. If there are additional nodes in the system housed in Expansion racks, repeat steps 3 through 8 for each Expansion rack adding 16 to the base node number. For all Expansion racks, ensure you are using the five meter Twinax cables.

## Racking a Cisco Nexus switch

The topics in this section are applicable to these Cisco Nexus switches:

- Cisco Nexus 5548UP
- Cisco Nexus 5596UP
- Cisco Nexus 31108PC-V
- Cisco Nexus 31128PQ

Cisco Nexus switches are 10G Ethernet switches with varying numbers of ports per switch. See the table below for details. Each switch occupies one rack unit. All switches mount in rack positions U25 and U26, unless noted otherwise.

Switch	Specifications
5548UP	Ports per switch: <b>32</b> <b>Note:</b> You can increase the number of ports to 48 by using one pair of 16 port expansion modules. Available HCP connections: <b>44</b>
5596UP	Ports per switch: <b>48</b> <b>Note:</b> You can increase the number of ports to 96 by using 3 pairs of 16 port expansion modules. Available HCP connections: <b>80</b>
31108PC-V	Ports per switch: <b>48</b> Available HCP connections: <b>44</b>
31128PQ	Ports per switch: <b>96</b> Available HCP connections: <b>80</b>

Items you need to rack the Ethernet switches include:

- #1 and #2 Phillips screwdrivers
- Caged-nut insertion and removal tool

## Step 7a: Unpacking a Cisco Nexus switch

To unpack a Cisco Nexus switch:

- 1.** Locate the following items in the switch container:
  - Cisco Nexus switch
  - 2 slider rails
  - 2 rear switch mounting brackets
  - 2 port side mounting ears
  - 12 M4 x 0.7 x 8-mm Phillips countersunk screws
- 2.** Supply the following items (per switch):
  - Eight M5 screws
  - Eight M5 caged nuts
- 3.** Locate a single 10G SFP+ to 1G RJ-45 adapter module, Cisco part number GLC-T=.P.
- 4.** Set the required items aside in an easy-to-reach location.
- 5.** Leave the unused items in the switch container, and set the container aside.

The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

Do not discard additional items. Pack them together and set them aside.

- 6.** If the system is ordered with more than 28 nodes, the switches arrive with sixteen port expansion modules. Optionally, to install the expansion modules in both switches:
  - a.** Locate the boxes containing the sixteen port Universal Port Expansion modules.



- b.** Unscrew the dummy plate from the front of the switch with a Philips screwdriver.
- c.** Release the dummy plate locking lever.



- d.** Carefully install the Port Expansion module by aligning the module in the switch and locking the lever into place.
- e.** Screw the module in place using the screw attached to the lever. Do not over-tighten.

## Step 7: Rack the Ethernet Switches



- f. Repeat steps a through e for the sixteen port expansion module in the second switch.

### Step 7b: Installing the switch rails

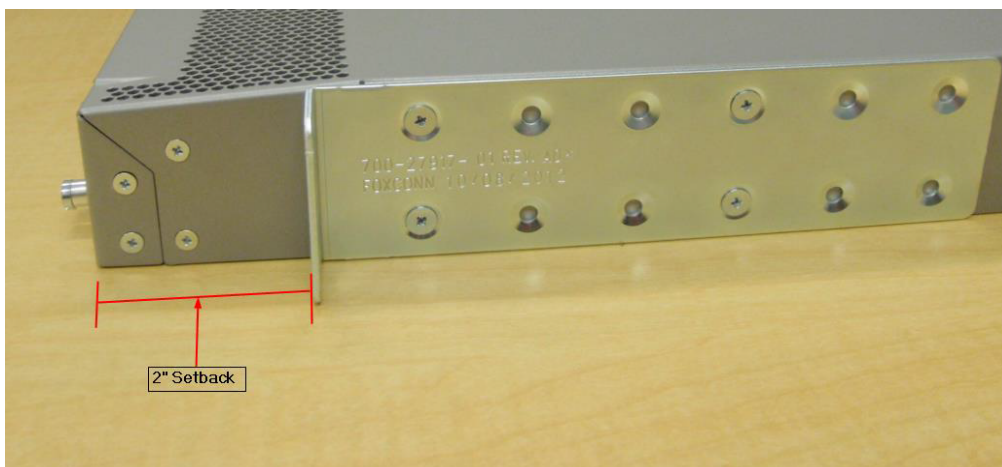
The following image shows the M4 screws, mounting rails, mounting rail guides, and mounting ears.



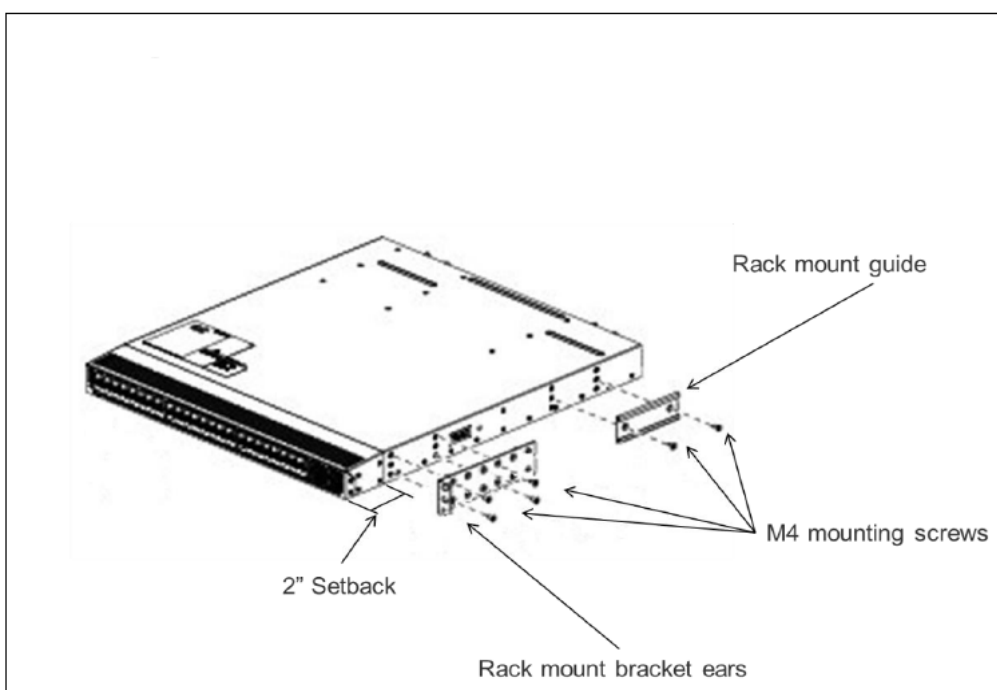
1. Orient the brackets with the mounting bracket ears to the port side of the switch.



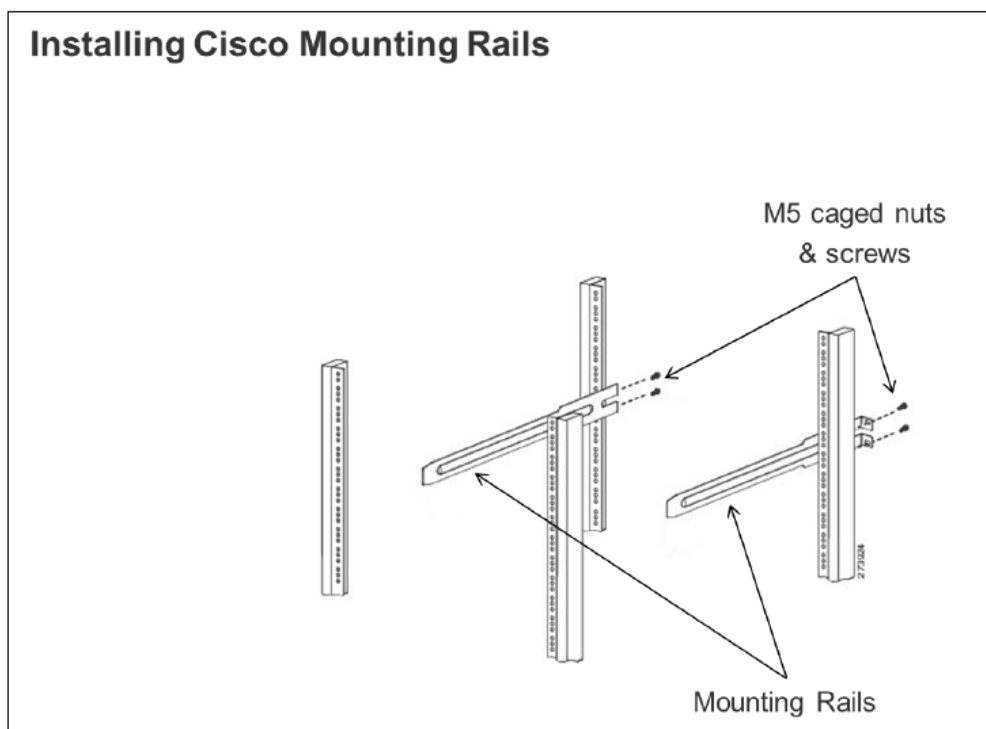
2. Attach the ears to the sides of the switch with four M4 screws per bracket so that the face of the switch is mounted with a 2 inch setback as shown in the image below. This way the switch extends 2 inches past the rear EIA rails.



3. Install the rear mounting bracket to the rear of the switch with two M4 mounting screws as shown below.



4. Repeat steps 1 through 3 for the other side of the switch and the other Cisco Nexus 10G Ethernet switches.
5. Install M5 caged nuts in the front of the rack in the bottom, middle, and upper square holes of rack positions U25 and U26 on both the left and right side of the rack.



**Important:** Be sure to install the caged nuts on the front of the rack in the center positions of each rack unit that will be occupied by a switch prior to installing the switches. It is not possible to do so later in the process.

### Step 7c: Mounting a Cisco Nexus switch

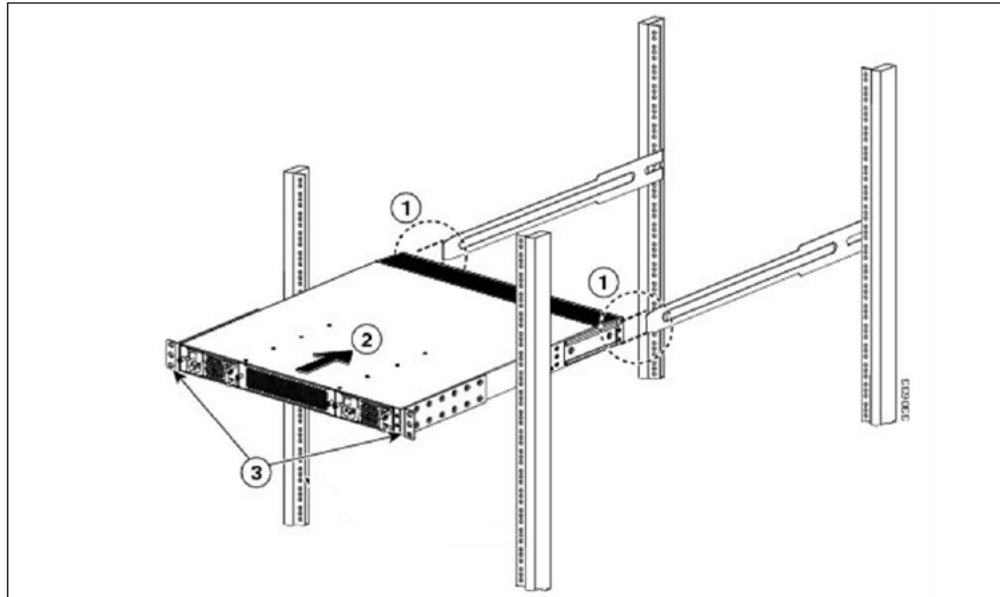
To mount a Cisco Nexus switch in the rack:

1. Install M5 caged nuts in the rear of the rack in the top and bottom square holes of rack positions U25 and U26 on both the left and right side of the rack.
2. Slide the first switch into place in U25, taking care to align the rear mounting brackets on the switch with the mounting rails attached to the front of the rack.
3. Secure the switch to the rack using four M5 screws.





**Note:** Although the graphic below shows the switch backwards, the principal is the same, and the general procedure should be followed.



1	Align the two rear rack-mount guides with the slider rails installed in the rack.
2	Slide the rack-mount guides onto the slider rails until the front rack-mount brackets come in contact with the front rack-mount rails.
3	Mount switch using four M5 screws with plastic washers per switch.

4. Repeat steps 2 and 3 for the second switch. Install the second switch in rack position U26.
5. Use two M5 screws with plastic washers to install two 1U perforated blanking panels in the front of rack units 25 and 26.



**Important:** Due to the height of the screws holding the rail kit to the rack, the panels do not sit flat on the vertical EIA rails of the rack. Do not over-tighten the screws to compensate.

### Step 7d: Connecting a Cisco Nexus switch to the PDUs

Connect the power cables of a Cisco Nexus switch to the PDUs.

For more information about which PDU outlets to plug the power cables of the Cisco Nexus 5548UP into, see [Step 5g: "Connect the HCP G11 Nodes to the PDUs"](#) on page 70.

### Step 7e: Install the SFP+ to RJ-45 adapter

Insert the 10G SFP+ to 1G RJ-45 adapter module into port 03 of the lower of the two switches.



### Step 7f: HCP G11 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430), the HCP G11 Node Ethernet ports can be set up for two different 1GbE back-end configurations. The pictures below show both of the possible ways to configure Ethernet ports on a HCP G11 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections, ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches. The port with the purple frame is the management port.



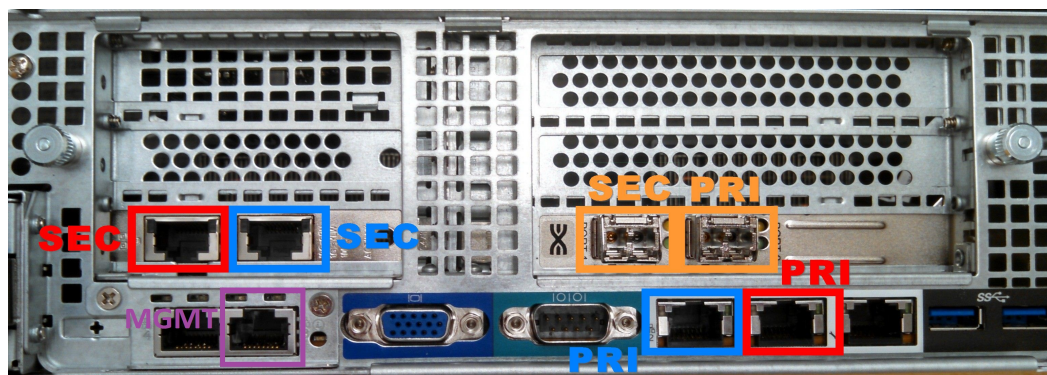
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**Note:** The purple port should not be used unless you are configuring the system to have a [hcp\_management] network.

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The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U25. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U26.

The following image shows an HCP G11 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX 6430 switch.



The following image shows an HCP G11 Node with 10G BASE-T ports for back-end connection and 10G SFP+ ports for the front-end connection. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX643 switch.



The bonding of the ports on the back-end Ethernet networking are different for the two configurations. Pay close attention to the network configuration when performing the Ethernet cabling.

### Step 7g: Cisco Nexus port diagrams

An HCP system comes with all the Twinax cables needed to support the ordered number of nodes. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax cables.



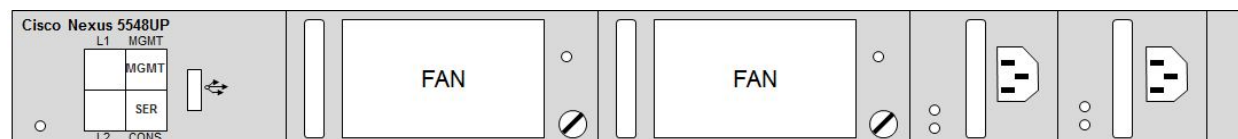
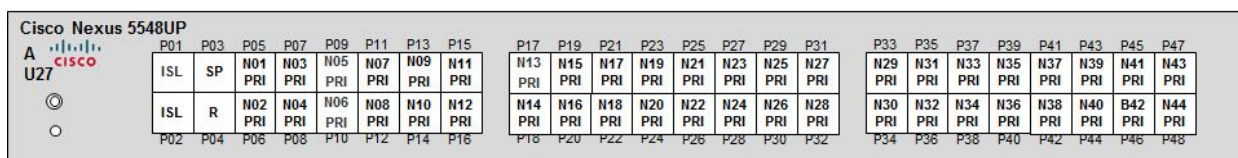
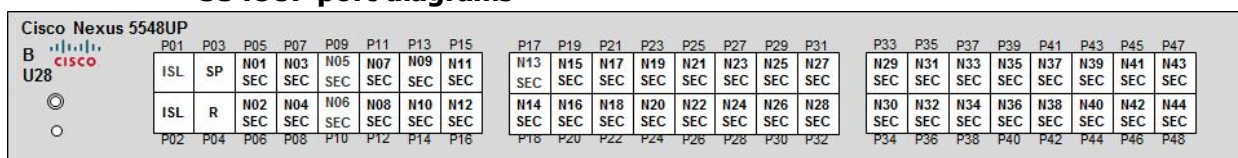
**Note:** Twinax cables from Brocade and Cisco are not compatible with one another. Please ensure you only use the vendor specific cables with the switches.

## Step 7: Rack the Ethernet Switches

Each of the diagrams below show six ports reserved for functions outside of communicating with the node. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

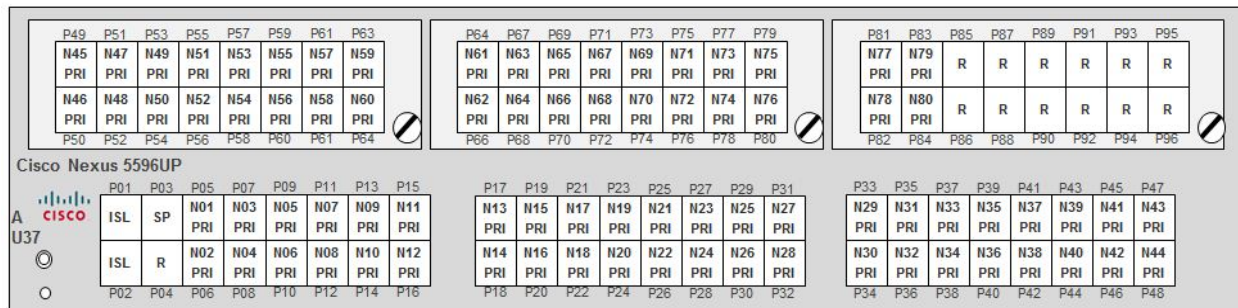
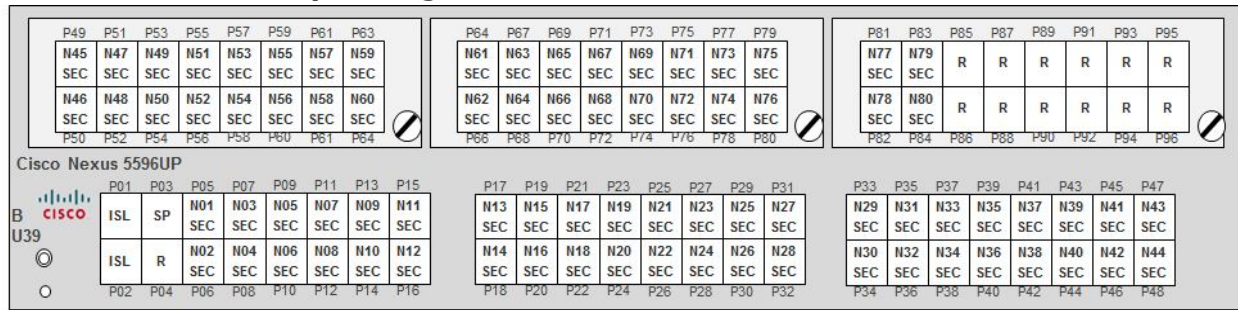
- **SER** — the serial port used to configure the switch later in the assembly process next to the management console
- **MGMT** — the management port used to configure the switch later in the assembly process
- **ISL** — the inter-switch link used to connect the two back-end switches to one another
- **SP** — the service port used by Hitachi Vantara service personnel
- **R** — a reserved port

## 5548UP port diagrams



**Note:** The management port on the switch does not correspond to the management port on the node. The management port on the node attaches connects to a normal switch port if you want to configure an [hcp\_management] network.



**5596UP port diagrams****C31108 port diagram****C31128 port diagram****Step 7h: Connecting the Ethernet cables**

To connect the cables:

- 1.** Locate two one meter Cisco Twinax cables. Connect the first cable from port 1 on the switch in position U25 to port 1 on the switch in position U26. Connect the second cable from port 2 on the switch in position U25 to port 2 on the switch in position U26.
- 2.** Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the switches in the Base or Appliance rack to the HCP Nodes. If there are five meter Twinax cables, they are used to connect nodes 17-44 in the Expansion racks to the back-end switches in the Base rack.
- 3.** Locate the label sheets containing pairs of numbered decals.
- 4.** Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.
- 5.** Connect one end of the Twinax cable to the switch in rack position U26 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.
- 6.** Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.
- 7.** Connect one end of the Twinax cable to the switch in rack position U26 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.
- 8.** Repeat steps 3 through 6 for each of the nodes in the Appliance or Base rack.
- 9.** Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.
- 10.** If there are additional nodes in the system housed in Expansion racks, repeat steps 3 through 8 for each Expansion rack adding 16 to the base node number. For all Expansion racks, ensure you are using the five meter Twinax cables.

## Racking the Cisco Nexus 5596UP

Cisco Nexus 5596UP switches are 10G Ethernet switches with 48 ports per switch. The switches can be expanded to 96 ports per switch using three pairs of sixteen port expansion modules. A pair of Cisco Nexus 5596UP switches can connect up to 80 HCPs. Each switch takes up two rack units. They switches are mounted in rack positions U37 and U39.

The items you need to rack the Ethernet switches include:

- #1 and #2 Phillips screwdrivers
- Caged-nut insertion and removal tool

### Step 7a: Unpack the Cisco Nexus 5596UP

To unpack the Cisco Nexus 5596 switch:

1. Locate the following items in the switch container:
  - Cisco Nexus 5596 switch
  - 2 slide rails
  - 2 rear switch mounting brackets
  - 2 port side mounting ears
  - 16 M4 x 0.7 x 8-mm Phillips flat-head screws
2. Supply the following items (per switch):
  - Eight M5 screws
  - Eight M5 caged nuts
3. Locate a single 10G SFP+ to 1G RJ-45 adapter module, Cisco part number GLC-T=.P.
4. Set the required items aside in an easy-to-reach location.
5. Leave the unused items in the switch container, and set the container aside.

## Step 7: Rack the Ethernet Switches

The rest of the items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

Do not discard additional items. Pack them together and set them aside.

- 6.** By default, the Cisco Nexus 5596UP 10G Ethernet switches come with 48 ports. Optionally, if the system is ordered with more than 44 nodes, the switches arrive with sixteen port expansion modules. To install the expansion modules in both switches:
  - a.** Locate the boxes containing the sixteen port Universal Port Expansion modules.



- b.** Unscrew the dummy plate from the front of the Cisco Nexus 5596UP 10G Ethernet switch with a Philips screwdriver.
  - c.** Release the dummy plate locking lever. The image shows a Cisco Nexus 5548 switch for example purposes.





- d.** Carefully install the Port Expansion module by aligning the module in the switch and lock the lever into place.
- e.** Screw the module in place using the screw attached to the lever. Do not over-tighten. The image shows a Cisco Nexus 5548 switch for example purposes.



- f.** Repeat steps a through e for the sixteen port expansion module in the second Cisco Nexus 5596UP switch. The following figure shows a Cisco Nexus 5596UP switch with two expansion modules installed.

## Step 7: Rack the Ethernet Switches

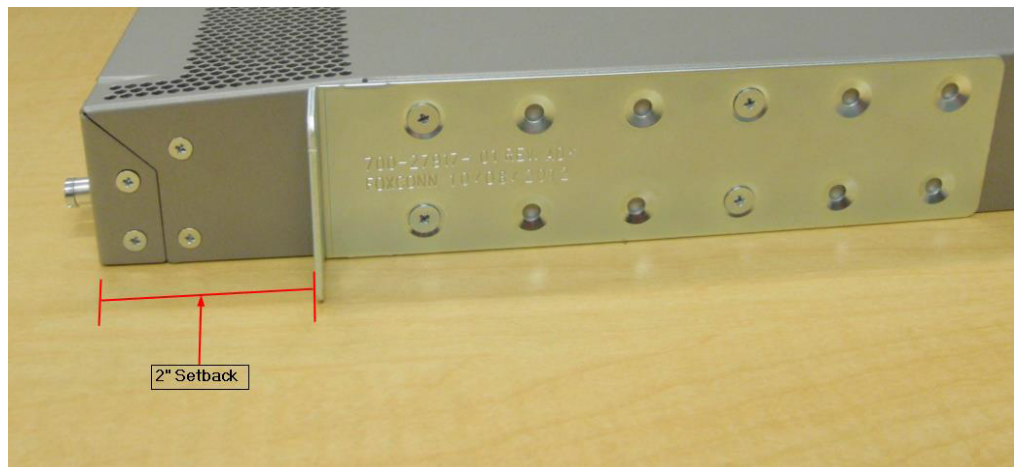


### Step 7b: Install the Cisco Nexus 5596UP rails

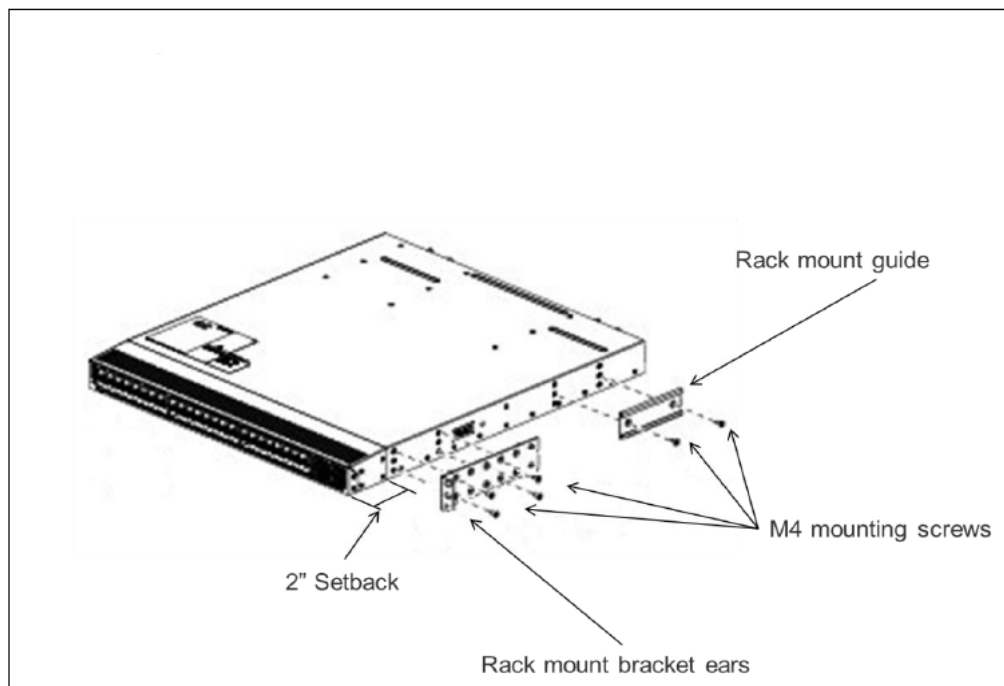
The following image shows the M4 screws, mounting rails, mounting rail guides, and mounting ears. The image depicts the components for the Cisco Nexus 5548UP switch. As such, the brackets are be slightly larger than the ones shown here in the image.



1. Orient the brackets with the mounting ears to the port side of the switch.
2. Attach the ears to the sides of the switch with four M4 screws per bracket so that the face of the switch is mounted with a 2 inch setback as shown in the image below. This way the switch extends 2 inches past the rear EIA rails. The switch shown in the image is a Cisco Nexus 5548UP, but the mounting of the bracket is almost identical.

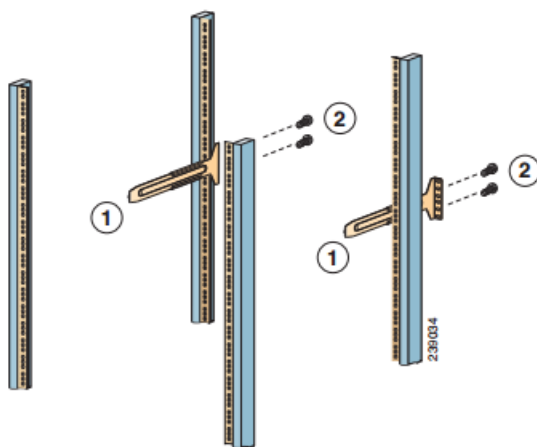


- 3.** Install the rear mounting bracket to the rear of the switch with four M4 mounting screws as shown below. The diagram shows a Cisco Nexus 5548UP switch, but the mounting is nearly identical.



- 4.** Repeat steps 1 through 3 for the other side of the switch and the other Cisco Nexus 5596UP 10G Ethernet switch.

5. Install M5 caged nuts in the front of the rack in the bottom and middle square holes of rack positions U37 and U39 and the middle and top square holes of rack positions U38 and U40 on both the left and right side of the rack.
6. Attach the first set of slide rails to the front of the rack in positions U37 and U38 using M5 screws.
7. Attach the second set of slide rails to the front of the rack in positions U39 and U40 using M5 screws.



**Important:** Be sure to install the caged nuts on the front of the rack in the center positions of each rack unit that will be occupied by a switch prior to installing the switches. It's not possible to do so later.

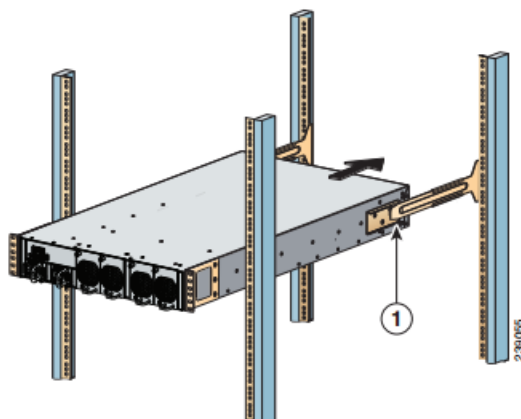
### Step 7c: Mount the Cisco Nexus 5596UP in the rack

To install the Cisco Nexus 5596UP switches in the rack:

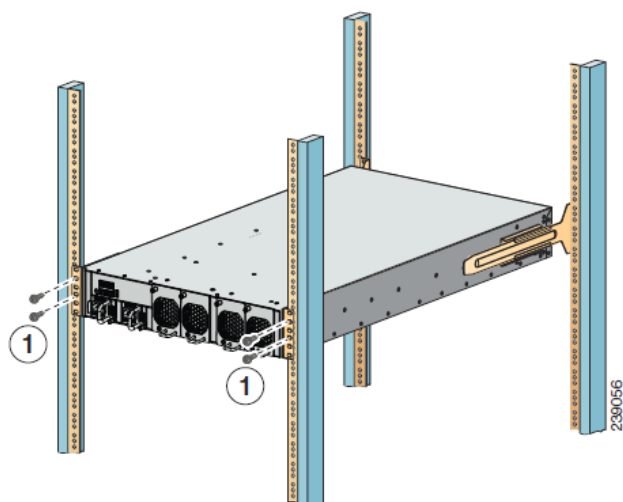
1. Install M5 caged nuts in the rear of the rack in the bottom square holes of rack positions U37 and U39 and the top square hole of rack positions U38 and U40 on both the left and right side of the rack.
2. Slide the first switch into place in U37, taking care to align the rear mounting bracket on the switch with the mounting rails attached to the front of the rack.
3. Secure the switch to the rack using four M5 screws.



**Note:** Although the graphic below shows the switch backwards, the principal is the same, and the general procedure should be followed.



4. Once the switch is all the way in the rack, secure the front rack-mount brackets to the rack using M5 rack screws (2 in each bracket).



5. Repeat steps 2-4 to mount the other Cisco Nexus 5596UP switch in rack unit 39.
6. Use M5 screws with plastic washers to install perforated blanking panels in the front of the switch rack units.

## Step 7d: Connect the Cisco Nexus 5596UP switches to the PDUs

Connect the power cables of the Cisco Nexus 5596UP switches to the PDUs.

For more information about which PDU outlets to plug the Cisco Nexus 5596UP switches into, see ["Considerations for HCP racking and PDU connections"](#) on page 41.

## Step 7e: Install the SFP+ to RJ-45 adapter

Insert the 10G SFP+ to 1G RJ-45 adapter module into port 03 of the lower of the two switches.



## Step 7f: HCP G11 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430), the HCP G11 Node Ethernet ports can be set up for two different 1GbE back-end configurations. The pictures below show both of the possible ways to configure Ethernet ports on a HCP G11 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections, ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches. The port with the purple frame is the management port.

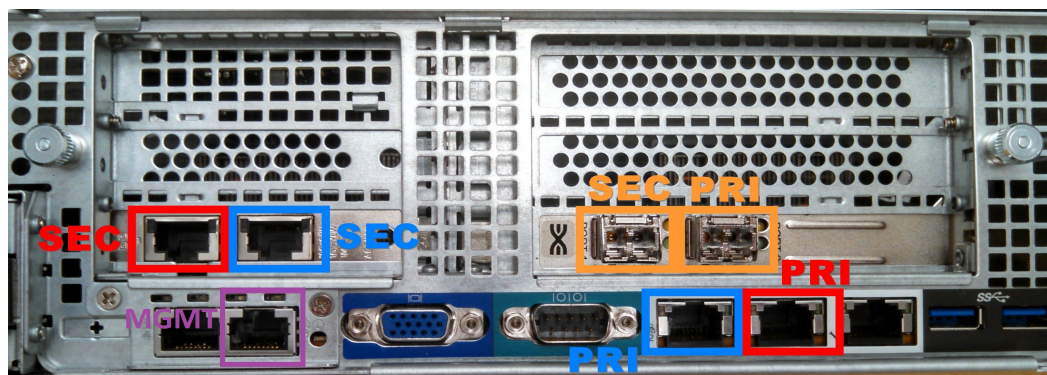


**Note:** The purple port should not be used unless you are configuring the system to have a [hcp\_management] network.

The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U25. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade ICX 6430 switch in rack position U26.

The following image shows an HCP G11 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX 6430 switch.





The following image shows an HCP G11 Node with 10G BASE-T ports for back-end connection and 10G SFP+ ports for the front-end connection. The 10G ports used for the back-end Ethernet networking run at 1G when connected to the Brocade ICX643 switch.



The bonding of the ports on the back-end Ethernet networking are different for the two configurations. Pay close attention to the network configuration when performing the Ethernet cabling.

### Step 7g: Cisco Nexus 5596UP port diagram

An HCP system comes with all the Twinax cables needed to support the ordered number of nodes. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax cables.

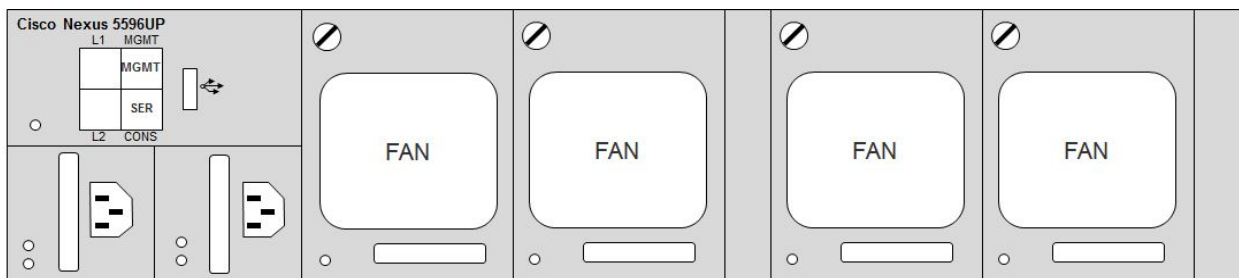
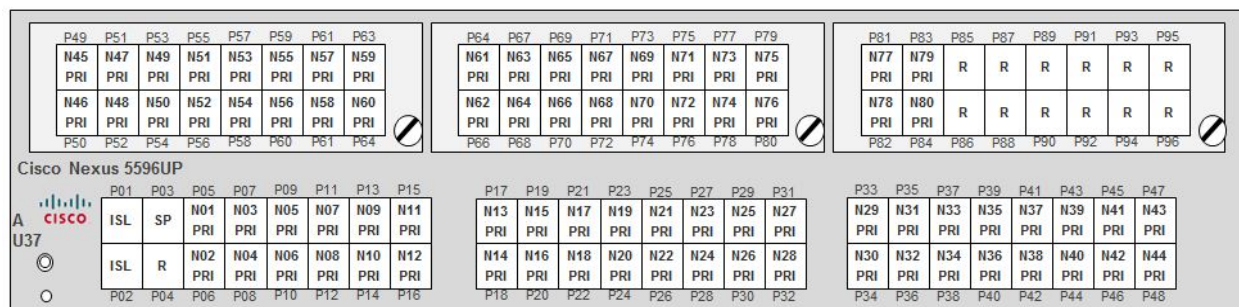
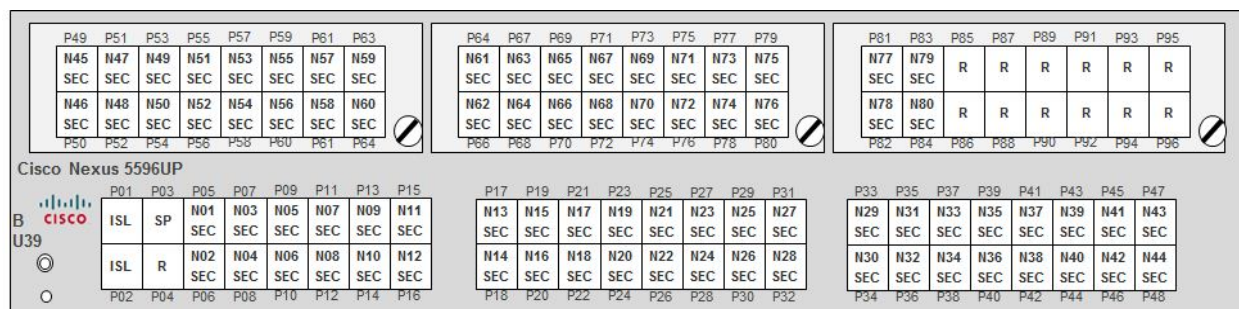


**Note:** Twinax cables from Brocade and Cisco are not compatible with one another. Please ensure you only use the vendor specific cables with the switches.

## Step 7: Rack the Ethernet Switches

The diagrams below show six ports reserved for functions outside of communicating with the node. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

- **SER** — the serial port used to configure the switch later in the assembly process to the management console
- **MGMT** — the management port used to configure the switch later in the assembly process
- **ISL** — the inter-switch link used to connect the two back-end switches to one another
- **SP** — the service port used by Hitachi Vantara service personnel
- **R** — a reserved port







**Note:** The management port on the switch does not correspond to the management port on the node. The management port on the node attaches connects to a normal switch port if you want to configure an [hcp\_management] network.



### Step 7h: Connect the Cisco Nexus 5596UP Ethernet cables

To connect the cables:

1. Locate two one meter Cisco Twinax cables. Connect the first cable from port 1 on the switch in position U25 to port 1 on the switch in position U26. Connect the second cable from port 2 on the switch in position U25 to port 2 on the switch in position U26.
2. Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the Cisco Nexus 5596UP switches in the Base or Appliance rack to the HCP Nodes. If there are five meter Twinax cables, they are used to connect nodes 17-80 in the Expansion racks to the back-end switches in the Base rack.
3. Locate the label sheet(s) containing pairs of numbered decals.
4. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

### Step 8 (conditional): Install the blanking plates

5. Connect one end of the Twinax cable to the Cisco Nexus 5596UP switch in rack position U25 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.
6. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.
7. Connect one end of the Twinax cable to the Cisco Nexus 5596UP switch in rack position U26 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.
8. Repeat steps 3-6 for each of the nodes in the Appliance or Base rack.
9. Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.
10. If there are additional nodes in the system housed in Expansion racks, repeat steps 3-8 for each Expansion rack adding 16 to the base node number. For all Expansion racks, ensure you are using the five meter Twinax cables.

## Racking the Extreme 210

Extreme 210 switches are 1G Ethernet switches which come with 24 or 48 ports per switch. A pair of Extreme 210 24 port switches can connect up to 22 HCPs. A pair of Extreme 210 48 port switches can connect up to 44 HCPs. Each switch takes up one rack unit. The switches are mounted in rack positions U25 and U26.

Items you need to rack the Ethernet switches include:

- #1 and #2 Phillips screwdrivers
- Caged-nut insertion and removal tool

## Step 8 (conditional): Install the blanking plates

If there are unused rack units in the rack, you need to cover the empty spaces with blanking plates. The blanking plates are solid plastic pieces that snap onto the front of the rack. Each blanking plate covers one rack unit.



To install a blanking plate:

1. Hold the plate up to the rack unit. The blanking plate edges should cover the square holes on the sides of the rack in the rack unit.



2. Gently press on the sides of the blanking plate until it snaps into place.

## Step 9: Reassemble the racks

Using Velcro straps and/or cable ties, bundle any excess length of the cable harnesses and power cords and secure them to the racks. Then replace the doors and sides on the racks.

# Connecting the HCP system at your site

A preassembled HCP SAIN system arrives with its internal physical connections complete:

- The nodes are connected to the back-end switches.
- The back-end switches are connected to each other.
- The trays in the storage array are connected to each other.
- All the components are plugged into the PDUs.

For a system ordered without a rack, the instructions in [Chapter 3: "Assembling rackless components"](#) on page 39, tell you how to make all the internal connections.

To get the system up and running in your environment, you need to make the external physical connections. You need to connect:

- The PDUs to the power sources
- The HCP system to your corporate network

This chapter provides instructions for these activities.

## Connecting to the power sources

An HCP SAIN system includes four PDUs. Each PDU has a fixed power cable of the applicable type for the location for which the system was ordered.

Each node is connected to two PDUs for redundancy.

You need to connect each PDU to a different power source at your site. If possible, these should be uninterruptible power sources (UPSs).



---

**Important:** Before connecting the PDUs to the power sources, ensure that all the power cables connecting the system components to the PDUs are firmly seated at both ends. These can sometimes come loose during shipping.

---

Once you've connected the PDUs to the power sources, you can power on the system:

1. Power on the controller tray (that is, the bottommost tray) in each storage array. This causes the other trays in the array to power on automatically.
2. Wait for the arrays to be online and ready to serve requests from the HCP nodes.
3. Power on the nodes.

The back-end switches power on automatically when the PDUs are connected to the power sources.

## Connecting to your corporate network

An HCP SAIN system should be connected to your corporate network through two front-end switches or through a single front-end switch using active/active bonding. You need to use the Ethernet cables you supply to connect each of these switches to a separate Ethernet switch in your corporate network.

If you configured the HCP system to support a management network, you node management ports should be connected to your front-end switches. The management network segregates system and tenant administration, management API, SNMP, syslog, outgoing SMTP, and SSH traffic from the [hcp\_system] network.

There are different types of cables and adapters that can be used to configure a front-end connection. The possible cable types are:

- **Fiber optic cables** — The cables used with optical transceivers.

- **Twinax cables** — The cables used with 10G SFP+ to 1G RJ-45 adapters.

The possible adapter types are:

- **Optical transceivers** — The transceivers should be installed into the front end ports of each HCP G11 node.
- **10G SFP+ to 1G RJ-45 adapters** — The adapters connect 10G SFP+ ports to a 1G network. The adapters should be installed into the front end ports of each HCP G11 node. These should not be confused with the single adapter provided with all 10G systems that is used by support personnel to perform switch maintenance.

In order to connect your system to the corporate network you need to cable your front-end switches to the nodes. An HCP G11 Node can have multiple network configurations. For more information about connecting your front-end network to your HCP G11 nodes, see [Step 7f: "HCP G11 Node 1 GB port diagram"](#) on page 130 and connect your cables to the red ports in the appropriate node diagram.



**Important:** The default front-end IP addresses for the HCP nodes go from 192.168.100.101 through 192.168.100.104 (or higher for a system with more than four nodes). If these IP addresses don't work for your computing environment, you need to change them *before* you connect the HCP nodes to your corporate network. For information about doing this, see ["Chapter 5: Reconfiguring the HCP system for your site"](#) on page 141.



**Note:** Make sure that you connect to your front-end switches, not your back-end.





# Reconfiguring the HCP system for your site

To reconfigure an HCP system for your computing environment, you need to:

- Verify that the serial number is correct in the system and, if it isn't, correct it
- Change the HCP network settings to match your computing environment
- Change the HCP DNS settings to match your computing environment
- Change the time settings for the HCP system to match your computing environment
- Make the back-end switches known to HCP

To perform these activities, you use the HCP System Management Console. You can do them in any order.

This chapter explains how to:

- Give yourself a System Management Console user account with the service role
- Perform the reconfiguration activities listed above



**Note:** To perform the reconfiguration activities in this chapter before connecting the HCP system to your corporate network, you need to use a computer directly connected to one of the back-end switches.



**Important:** This chapter describes activities to be performed when you first set up the HCP system at your site. Before performing these activities at any other time, be sure to consult your authorized HCP service provider.

## Preparing to reconfigure the system

To reconfigure an HCP system for your computing environment, you first need to create a user account that has the service role. To do this, follow the steps outlined in the table below.

Step	Activity	More information
1	Connect a client computer to the HCP default back-end network.	<a href="#">Step 1: "Connect to the HCP default back-end network"</a> below below
2	Log into the System Management Console with the initial user account.	<a href="#">Step 2: "Log in with the initial user account"</a> on the facing page
3	Check the health of the HCP system.	<a href="#">Step 3: "Check the health of the HCP system"</a> on page 144
4	Create a new user account with the service role.	<a href="#">Step 4: "Create a service account"</a> on page 145
5	Log into the System Management Console with the new user account.	<a href="#">Step 5: "Log in with the service account"</a> on page 146



**Tip:** Do not create additional user accounts until you're sure the HCP system is fully operational.

For more information about user accounts and roles, see *Administering HCP*.

### Step 1: Connect to the HCP default back-end network

For you to use the HCP System Management Console, you need a client computer with connectivity to the default back-end subnet to which the HCP nodes belong. To connect a client computer to this subnet:

1. Ensure that the client computer has a physical connection to one of the back-end switches used by the HCP system.

2. If the client computer is not in the HCP default back-end subnet:
  - a. Make a note of the current IP address and subnet mask for the client computer so you can reset them after you change the network settings for the HCP system.
  - b. On the client computer, set the IP address for the local area network to 10.1.1.100.
  - c. On the client computer, set the subnet mask to 255.255.255.0.

## Step 2: Log in with the initial user account

To log into the HCP System Management Console for the first time:

1. On a computer connected to the HCP back-end network, open a browser window.
2. In the address field, enter:

`https://10.1.1.101:8000`

The IP address in this URL is the preconfigured back-end IP address of one of the nodes in the HCP system.

3. When prompted, accept the HCP SSL server certificate temporarily for the current session.

The System Management Console login page appears.

4. In the **Username** field, type this case-sensitive username: *security*
5. In the **Password** field, type this case-sensitive password: *Chang3Me!*
6. Click the **Log In** button.

The Console displays the **Change Password** page.

7. On the **Change Password** page:
  - In the **Existing Password** field, type: *Chang3Me!*
  - In the **New Password** field, type a new password for the *security* account.

Passwords must be from six through 64 characters long, are case sensitive, and can contain any valid UTF-8 characters, including white space. The minimum password length is six characters.

To be valid, a password must include at least one character from two of these three groups: alphabetic, numeric, and other.

- In the **Confirm New Password** field, type the new password again.



---

**Tip:** Remember this password. You will need it later to set up additional user accounts. For more information about setting up user accounts, see *Administering HCP*.

---

8. Click the **Update Password** button.

### Step 3: Check the health of the HCP system

At this point, you need to ensure that the HCP system is running properly. To do this:

1. In the top-level menu of the HCP System Management Console, click **Hardware**.
2. On the **Hardware** page, for each node, check that:
  - The node status is **Available**
  - The status of each logical volume is **Available** or, for spindown volumes (if the system has any), either **Available** or **Spun down**



---

**Tip:** To see the status of a logical volume, hover over the volume icon.

---

If all the nodes and logical volumes are available, you can safely continue with the HCP system reconfiguration.

If any nodes have a status other than **Available** or if any logical volumes for available nodes have a status other than **Available** or **Spun down**, please contact your authorized HCP service provider for help. Also contact your service provider if the number of logical volume icons for each node does not match your expected number of logical volumes for the node.

## Step 4: Create a service account

To create a user account that you can use to reconfigure the HCP system, in the System Management Console:

1. In the top-level menu, select **Security ► Users**.
2. On the **Users** page, click **Create User Account**.
3. In the **Create User Account** panel:
  - In the **Username** field, type a username for the user account. Usernames must be from one through 64 characters long and can contain any valid UTF-8 characters, but cannot start with an opening square bracket ([). White space is allowed.
  - In the **Full Name** field, type a full name for the user account. This name must be from one through 64 characters long and can contain any valid UTF-8 characters, including white space.
  - In the **Password** field, type a password for the user account. Passwords must be from six through 64 characters long, are case sensitive, and can contain any valid UTF-8 characters, including white space. The minimum password length is six characters.

To be valid, a password must include at least one character from two of these three groups: alphabetic, numeric, and other.

  - In the **Confirm Password** field, type the password again.



**Note:** Remember this password. You will need it for the reconfiguration activities in this chapter.

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- In the **Roles** section, select **Service**.
4. Click the **Create User Account** button.
  5. In the upper right corner of the Console, click **Log Out**.

The Console returns to the login page.

## Step 5: Log in with the service account

Now that you've created a user account with the service role, you can use that account to log into the HCP System Management Console and perform system reconfiguration activities. This time, when you log in, the Console displays the **Overview** page.



**Caution:** The service role lets you take additional actions that are not described in this book. Some of these actions can have a significant impact on the HCP system. Before taking any other service role actions, be sure you understand their consequences.



**Tip:** After you complete the last reconfiguration activity, log out of the System Management Console and close the browser window to ensure that no one can return to the Console on your computer without a fresh login.

## Verify the serial number

Each HCP system is assigned a unique five-digit serial number. With a preassembled system, this number is on a label that's attached to the side of the system rack at the bottom, just inside the left rear door. With a rackless system, this number is on a label taped to the top of the first node you mount when you assemble the system.

When the HCP system software is installed, the serial number is entered as part of the system configuration. You need to verify that the serial number in the system configuration matches the serial number of the label attached to the rack. If the serial numbers don't match, you need to change the serial number in the system configuration.

To verify and, if necessary, change the serial number in the HCP system configuration:

1. In the top-level menu of the System Management Console, select **Configuration ► Miscellaneous**.
2. Verify that the serial number in the **Serial Number from Rack Label** field is the same as the serial number on the label delivered with the system.
3. If the serial numbers are not the same:

- a. In the `Serial Number from Rack Label` field, type the serial number from the label attached to the rack.
- b. Click the **Update Settings** button.

## Changing network settings

The HCP system is installed with default network settings. You need to change these settings to match your computing environment. Before you can do this, you need to know:

- The IP address to use for the front-end gateway router. Typically, the first three octets in this address are the same as the first three octets in the IP address of the front-end network.
- The subnet mask for the front-end IP addresses.
- If the corporate network is configured to support virtual networking and you want to tag the HCP front-end network, the VLAN ID to use for that network. For information about virtual networking, see *Administering HCP*.
- The front-end IP address to use for each HCP node.



**Note:** Node numbers don't change when you change IP addresses.

---

- Whether HCP should hide the IP addresses of the master name servers for the front-end network and allow client access to HCP over the network only through specified downstream DNS servers. A DNS configuration that functions in this way is called **hidden master**.

A **downstream DNS server** is a DNS server through which client requests are routed to HCP.

For more information about this and the next two properties, see *Administering HCP*.

- Whether HCP should notify specified downstream DNS servers about changes to the zone definition for the front-end network.



- The rate at which the downstream DNS servers should query HCP for updates to the zone definition for the front-end network domain. The default is three hours.

For the refresh rate for the [hcp\_system] network, you can specify any combination of weeks (W), days (D), hours (H), minutes (M), and seconds (S), using this syntax:

#W#D#H#M#S

These considerations apply to specifying the refresh rate:

- In each case, # must be an integer greater than or equal to one.
  - If an integer is specified without a time unit, the time unit is assumed to be seconds.
  - Time units can be specified in any order.
  - Any given time unit can be specified only once.
  - Time units are not case sensitive.
  - The total time specified must be in the range one through 2,147,483,647 seconds.
- The back-end IP address to use for each HCP node. You can change only the first three octets of the back-end IP addresses. You cannot change the fourth octet.



**Important:** Change the default back-end IP addresses only if they conflict with existing front-end IP addresses at your site.

---

After you've made all the necessary changes to the front-end and back-end network settings, you can safely connect the HCP system to your corporate network.

## Changing the front-end network settings

To change the HCP front-end network settings:

1. In the top-level menu of the System Management Console, select **Configuration ► Networks**.
2. In the list of networks on the **Networks** page, click [hcp\_system].

**3.** In the panel for the [hcp\_system] network:

- To change the gateway IP address, in the **Gateway** field, type the new IP address.
- To change the subnet mask, in the **Netmask** field, type the new subnet mask.
- To make the front-end network tagged, select the **Make tagged network** option. Then, in the **VLAN ID** field, type a unique VLAN ID for the network. Valid values are integers in the range one through 4,095.
- To change the DNS settings for the network, click the **Downstream DNS Configuration** link. Then:
  - To enable or disable hidden master, select or deselect, respectively, the **Enable hidden master** option.
  - To enable or disable notify, select or deselect, respectively, the **Enable notify** option.
  - If you are enabling hidden master or notify, in the **Downstream DNS Servers** field, type a comma-separated list of the IP addresses of one through ten downstream DNS servers. Spaces are not allowed.
  - To change the refresh rate, in the **Refresh Rate** field, type the new refresh rate. For valid values for the refresh rate, see ["Changing network settings"](#) on page 147 above.
- To change the node IP addresses, in the **Node IP Addresses** section, type new front-end IP addresses for the nodes in the HCP system.



**Note:** Do not change the value in the **MTU** field.

---

**4.** Click the **Update Settings** button.

A warning message appears asking you to confirm the changes you've made.

**5.** In the field in the message window, type *YES*. This is case sensitive.

**6.** Click the **Update Settings** button.

The HCP system restarts with the new settings. This takes a few minutes.

7. If you do not need to change the back-end settings, you can now safely connect the HCP system to your corporate network.
8. Log back into the System Management Console after the system restarts. Then proceed to the next configuration activity.

## Changing the back-end network settings

To change the HCP back-end network node IP address settings:

1. In the top-level menu of the System Management Console, select **Configuration ► Networks**.
2. In the list of networks on the **Networks** page, click [hcp\_backend].
3. In the **Node IP Addresses** section in the [hcp\_backend] panel, type new back-end IP addresses for the nodes in the HCP system.



**Important:** Do not change the values of the **Multicast Address** or **Netmask** field.

---

4. Click the **Update Settings** button.

A warning message appears asking you to confirm the changes you've made.

5. In the field in the message window, type *YES*. This is case sensitive.
6. Click the **Update Settings** button.

The HCP system restarts with the new settings. This takes a few minutes.



---

**Note:** If you changed the back-end IP addresses of the HCP nodes:

1. Change the IP address of the client computer to match the new HCP back-end subnet.
  2. Change the IP address of the HCP system switches to match the new HCP back-end subnet.
  3. Change the IP address of the HCP system SNMP trap receiver addresses to match the new HCP back-end subnet.
  4. Log into the System Management Console again after the system restarts. Remember to use one of the new back-end IP addresses in the Console URL.
- 

## Changing DNS settings

For the HCP system to use DNS services, you need to enable the use of DNS in HCP and specify the IP addresses of all the DNS servers in your environment that are upstream from HCP. An **upstream DNS server** is a DNS server to which HCP routes the outbound communications it initiates (for example, for sending log messages to syslog servers or for communicating with Active Directory).

Specifying all the DNS servers ensures that the HCP system can be addressed by hostname as long as at least one of those servers is available. To specify the DNS servers, you need to know their IP addresses.



---

**Note:** If you have not yet configured HCP as a subdomain in the DNS, do so now. For information about doing this, see *Administering HCP*.

---

When changing DNS settings, you can also change the hostname prefix used to name the nodes in the HCP system. You need to do this if you have two HCP systems and:

- You use Active Directory® authentication for access to HCP
- The two systems have one or more node numbers in common

If you don't use DNS at your site, you need to disable the use of DNS in HCP.

To change the HCP system DNS settings:

1. In the top-level menu of the System Management Console, select **Configuration ► DNS**.
2. On the **DNS Settings** page:
  - Do either of these:
    - If you want to use DNS with HCP, select the **Use DNS** option.
    - If you don't want to use DNS with HCP, deselect the **Use DNS** option and skip to Step 4.
  - Optionally, in the **Hostname Prefix** field, type a new hostname prefix. The hostname prefix can be from one through 12 characters long and can contain only lowercase letters, numbers, and hyphens (-).



---

**Tip:** To make node names easier to read, end the hostname prefix with a hyphen (-).

---

- In the **Upstream DNS Servers** field, type a comma-separated list of the IP addresses of all the upstream DNS servers. Spaces are not allowed.
3. Click the **Update Settings** button.
- A warning message appears asking you to confirm the changes you've made.
4. In the field in the message window, type **YES**. This is case sensitive.
  5. Click the **Update Settings** button.

The Console confirms that you have successfully updated the DNS settings, and HCP restarts. Wait a few minutes for the system to finish restarting. Then proceed to the next reconfiguration activity.

## Changing time settings

The internal time of the delivered HCP system may not exactly match the time in your computing environment. You can choose to leave the HCP time as is, reset it to match your environment and still have the system use its own internal time, or use one or more external time servers.

If you choose to use external time servers, you need to know the IP addresses or hostnames of those servers. Additionally, you need to know the time zone you want HCP to use.



**Note:** For you to specify an external time server, the HCP system must have connectivity to the time server through the front-end network.

In any case, you need to know the time zone you want HCP to use. HCP stores all times (such as creation dates and retention settings) in Coordinated Universal Time (UTC) and uses its time zone setting only for presentation purposes.



**Note:** HCP systems can be configured not to allow changes to time settings through the System Management Console. If your system is configured this way, you cannot make the changes described in this section.

To change the time settings for the HCP system:

1. In the top-level menu of the System Management Console, select **Configuration ► Time**.
2. On the **Time Settings** page:
  - Optionally, in the **Time Servers** field, type a comma-separated list of the IP addresses or hostnames of one or more time servers. Spaces are allowed.
  - Optionally, if the time source is internal, in the **Current Time** field, type the current time. The format for the time is *MMDDhhmmYYYY*, where *MM* is the two-digit month, *DD* is the two-digit day, *hh* is hours on a 24-hour clock, *mm* is minutes, and *YYYY* is the four-digit year. The time you specify cannot be more than one year in the future or 23 hours and 45 minutes in the past.

If the time source is internal and you leave this field blank, the current system time doesn't change.

  - Optionally, in the **Time Zone** field, select the new time zone.
3. Click the **Update Settings** button.

A warning message appears asking you to confirm the changes you've made.

4. In the field in the message window, type *YES*. This is case sensitive.
5. Click the **Update Settings** button.

The Console confirms that you have successfully updated the time settings, and HCP restarts. Wait a few minutes for the system to finish restarting. Then proceed to the next reconfiguration activity.

## Making the back-end switches known to HCP

You can choose to have HCP report the status of the back-end switches in the System Management Console. For HCP to do this, you need to make each switch known to HCP. You do this by telling HCP about the model and IP address of the switch.


By default, the IP addresses of the back-end switches are 10.1.1.252 and 10.1.1.253. If you changed the back-end IP addresses of the HCP nodes, the switch IP addresses need to change as well. For help with this, contact your authorized HCP service provider.

To make the back-end switches known to HCP:

1. In the top-level menu of the System Management Console, select **Configuration ► Monitored Components**.
2. On the **Monitored Components** page, for each switch:

- a. Click **Add**.

A new row appears in the **Components** list. The row is highlighted in green.

If you inadvertently add an extra row, click the delete control (  ) for the row to remove it.

- b. In the **Model** field in the new row, select the model of the switch that's supplied with the system.
  - c. In the **IP Address** field, type a valid IPv4 address for the switch.
3. Click the **Update Settings** button.

## Using SSH to access an HCP node

When access to an HCP Node through the HCP System Management Console or management API is not possible, authorized service providers can use SSH login to access the node.



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**Important:** By default, SSH login is disabled. Disabling SSH enhances security, but also increases the amount of time required for an authorized service provider to diagnose and resolve issues. For information, see [Enabling SSH](#).

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## BMC administrative credentials

As part of the on-site HCP setup, the administrative credential associated with each HCP system's baseboard management controller (BMC) must be updated. To perform the update, contact your HCP service provider.

## Configuring the BMC to monitor servers

You can configure the HCP system baseboard management controller (BMC) to your corporate network to monitor the health of your servers. If you want to enable this feature, contact your HCP sales representative.





# Configuring HCP monitoring with Hitachi Remote Ops

**Hitachi Remote Ops** is a Hitachi Vantara product that enables remote monitoring of the nodes and storage in an HCP SAIN system. With Hitachi Remote Ops, you can view the status of these components in a web browser. You can also configure Hitachi Remote Ops to notify you by email of error conditions as they occur. Additionally, you can configure Hitachi Remote Ops to report error conditions to Hitachi Vantara support personnel. It is recommended to set up Hitachi Remote Ops on all new HCP systems.

Hitachi Remote Ops is for monitoring and error notification purposes only. It does not allow any changes to be made to the system.

Hitachi Remote Ops is installed on a server that is separate from the HCP system. The program uses SNMP to retrieve information from HCP, so SNMP must be enabled in HCP.



**Note:** HCP supports IPv4 and IPv6 network connections to Hitachi Remote Ops servers. However, Hitachi Remote Ops support for IPv6 network connections varies based on the Hitachi Remote Ops server operating system. For information about requirements for Hitachi Remote Ops servers that support IPv6 networks, see the applicable Hitachi Remote Ops documentation.

This chapter explains how to set up monitoring of HCP nodes with Hitachi Remote Ops. For information about setting up storage monitoring, see the Hitachi Remote Ops documentation.

The chapter assumes that Hitachi Remote Ops is already installed and running according to the documentation that comes with the product.

## Enabling SNMP in HCP

To enable Hitachi Remote Ops to work with HCP, you need to enable SNMP in the HCP System Management Console. When you enable SNMP, you can select version 1 or 2c or version 3.

By default, Hitachi Remote Ops is configured to support SNMP version 1 or 2c with the community name *public*. If you change the community name in HCP or if you select version 3, you need to configure a new SNMP user in Hitachi Remote Ops to match what you specify in HCP. For more information about this, see the Hitachi Remote Ops documentation.

Once SNMP is enabled, the first four nodes in the HCP system monitor for switch SNMP traps. If there are more than four HCP nodes in the system, additional HCP node back-end addresses can be added to the SNMP trap receivers list on the back-end switches. For more information about adding extra nodes back-end address to the SNMP trap receivers list, contact your HCP customer support.

To enable SNMP in HCP for use with Hitachi Remote Ops:

1. Log into the HCP System Management Console using the initial user account, which has the security role.
2. In the top-level menu of the System Management Console, select **Monitoring ► SNMP**.
3. In the **SNMP Settings** section on the **SNMP** page:
  - Select the **Enable SNMP at snmp.hcp-domain-name** option.
  - Select either **Use version 1 or 2c** (recommended) or **Use version 3**.  
  
If you select **Use version 3**, specify a username and password in the **Username**, **Password**, and **Confirm Password** fields.
  - Optionally, in the **Community** field, type a different community name.
4. Click the **Update Settings** button.

5. In the entry field in the **Allow** section, type the IP address that you want HCP to use to connect to the server on which Hitachi Remote Ops is installed. Then click the **Add** button.
6. Log out of the System Management Console and close the browser window.

## Configuring Hitachi Remote Ops

To configure Hitachi Remote Ops to monitor the nodes in the HCP system, follow the steps outlined in the table below.

Step	Activity	More information
1	Log into Hitachi Remote Ops.	<a href="#">Step 1: "Log in to Hitachi Remote Ops"</a> below
2	Set the Hitachi Remote Ops base configuration, including the email addresses to which email about error conditions should be sent.	<a href="#">Step 2: "Set the base configuration"</a> on the next page
3	Optionally, configure transport agents for reporting error conditions to Hitachi Vantara support personnel.	<a href="#">Step 3 (conditional): "Configure transport agents"</a> on page 161
4	Identify the HCP system to be monitored.	<a href="#">Step 4: "Identify the HCP system"</a> on page 162

### Step 1: Log in to Hitachi Remote Ops

To log in to Hitachi Remote Ops:

1. Open a web browser window.
2. In the address field, enter the URL for the Hitachi Remote Ops server (using either the hostname or a valid IP address for the server) followed by the port number 6696; for example:

`http://remoteops:6696`

3. In the **Select one of the following UserIds** field, select **Administrator**.
4. In the **Enter the corresponding password** field, type the case-sensitive password for the Administrator user. By default, this password is *hds*.

If Hitachi Remote Ops is already in use at your site for monitoring other devices, this password may have been changed. In this case, see your Hitachi Remote Ops administrator for the current password.

5. Click the **Logon** button.

## Step 2: Set the base configuration

The Hitachi Remote Ops base configuration specifies information such as the customer site ID, how frequently to scan devices, and whether to report communication errors that occur between Hitachi Remote Ops and monitored devices. The base configuration also specifies the addresses to which Hitachi Remote Ops should send email about error conditions.

If Hitachi Remote Ops is already in use at your site, the base configuration may already be set. In this case, you can leave it as is, or you can make changes to accommodate the addition of HCP to the devices being monitored.

To set the Hitachi Remote Ops base configuration:

1. In the row of tabs at the top of the Hitachi Remote Ops interface, click **Configuration**.

The **Base** page is displayed by default. To return to this page from another configuration page, click **Base** in the row of tabs below **Configuration**.

2. In the **Device Monitoring** section:

- In the **Site ID** field, type your Hitachi Vantara customer ID. If you don't know your customer ID, contact your authorized HCP service provider for help.
- Optionally, specify different values in the other fields to meet the needs of your site. For information about these fields, click the **Help on this table's entries** link above the fields.

3. In the **Notify Users by Email** section:

- In the **eMail Server** field, type the fully qualified hostname or a valid IP address of the email server through which you want Hitachi Remote Ops to send email about error conditions.

- In the **Local Interface** field, select the Ethernet interface that has connectivity to the specified email server. (This is the interface on the Hitachi Remote Ops server.)
- In the **User List** field, type a comma-separated list of the email addresses to which Hitachi Remote Ops should send email about error conditions.
- In the **Sender's Email Address** field, type a well-formed email address to be used in the From line of each email.

Some email servers require that the value in the From line be an email address that is already known to the server.

4. Click the **Submit** button.
5. Optionally, to send a test email to the specified email addresses, click the **Test Email** button.

### Step 3 (conditional): Configure transport agents

A Hitachi Remote Ops transport agent transfers notifications of error conditions to a target location where Hitachi Vantara support personnel can access them. The transfer methods available are HTTPS, FTP, or dial up. For the destinations for each method, contact your authorized HCP service provider.

You can specify multiple transport agents. Hitachi Remote Ops tries them in the order in which they are listed until one is successful.

To configure a transport agent:

1. In the row of tabs below **Configuration**, click **Transport Agents**.
2. In the field below **Data Transfer Agents**, select the transfer method for the new transport agent.
3. Click the **Create** button.

The new transport agent appears in the list of transport agents. A set of configuration fields appears below the list.

4. In the configuration fields, specify the applicable values for the new transport agent. For information about what to specify, see the Hitachi Remote Ops documentation.

5. Click the **Submit** button.

You can change the order of multiple transport agents by moving them individually to the top of the list. To move a transport agent to the top of the list:

1. In the **Move to Top?** column, select the transport agent you want to move.
2. Click the **Submit** button.

## Step 4: Identify the HCP system

To identify the HCP system to be monitored:

1. In the row of tabs at the top of the Hitachi Remote Ops interface, click **Summary**.

The **Summary** page displays up to four tables that categorize the devices known to Hitachi Remote Ops — Device Errors, Communication Errors, Devices Okay, and Not Monitored. To show or hide these tables, click in the checkboxes below the table names at the top of the page to select or deselect the tables, as applicable. Then click the **Refresh** button.

While no tables are shown, the page contains an **Add a device** link.

2. Take one of these actions:
  - If the **Summary** page doesn't display any tables, click the **Add a device** link.
  - If the **Summary** page displays one or more tables, click the **Item** column heading in any of the tables.
3. In the **Select Device Type** field, select **Hitachi Content Platform (HCP)**.

A set of configuration fields appears.

4. Optionally, in the **Name** field, type a name for the HCP system. The name can be from one through 40 characters long. Special characters and spaces are allowed.

Typically, this is the hostname of the system.

5. Optionally, in the **Location** field, type the location of the HCP system. The location can be from one through 40 characters long. Special characters and spaces are allowed.
6. Optionally, in the **Group** field, type the name of a group associated with the HCP system (for example, Finance Department). The group name can be from one through 40 characters long. Special characters and spaces are allowed.
7. In the **Site ID** field, type your Hitachi Vantara customer ID. If you don't know your customer ID, contact your authorized HCP service provider for help.
8. In the **IP Address or Name (1)** field, type a valid front-end IP address for the lowest-numbered storage node in the HCP system. In the **Local Interface** field, leave the value as **-any-**.
9. In the **IP Address or Name (2)** field, type a valid front-end IP address for the highest-numbered storage node in the HCP system. In the **Local Interface** field, leave the value as **-any-**.
10. In the **SNMP Access ID** field, select the SNMP user that corresponds to the SNMP configuration in HCP. Typically, this is **public**.

For information about configuring SNMP in HCP, see ["Enabling SNMP in HCP"](#) on page 158.

11. In the **Comms Error Reporting?** field, select one of these options to specify whether Hitachi Remote Ops should report communication errors that occur between Hitachi Remote Ops and the HCP system:
  - **Yes** — Report communication errors.
  - **No** — Don't report communication errors.
  - **Local** — Report communication errors only to the email addresses specified in the base configuration and not through the specified transport agents.
  - **Default** — Use the setting in the base configuration.
12. Leave **Enabled?** selected.
13. Leave **Trace?** unselected.
14. Click the **Add** button.



If the operation is successful, the interface displays a message indicating that the HCP system has been added. Do not click the **Add** button again. Doing so will add the system a second time.

## Configuring DNS for HCP

**Domain name system** (DNS) is a network service that translates, or **resolves**, domain names (for example, example.com) into IP addresses for client access. The service is provided by one or more servers, called **name servers**, that share responsibility for resolving client requests.

An HCP system can exist as multiple domains in the DNS — one for each front-end network defined in the system. Each of these domains must be a subdomain of a DNS domain to which you have administrative access, such as your corporate domain. All nodes that have IP addresses defined for a given front-end network belong to the HCP domain defined for that network.



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**Note:** If you enable the management network, you cannot access your front-end network through DNS unless you create secondary zones for the management network.

---

To enable access to HCP by domain name on any given network, you need to configure the HCP domain for that network in your DNS. To do this, you can use either secondary zones (also called slave zones) or stub zones.

This chapter contains:

- A discussion of the advantages of using DNS
- A description of zones, secondary zones, and stub zones
- Windows and Unix instructions for configuring HCP domains in the DNS
- Instructions for verifying the HCP domain definitions
- DNS considerations for implementing HCP service by remote systems

For information about domains defined in HCP, see [About domains](#). For information about HCP networks, see [About virtual networking with HCP](#).



### Notes:

- HCP does not require DNS. For information about using HCP without DNS, see [System Management Console URL](#).
- When communicating with a DNS server, HCP may send packets that are larger than 512 bytes. You need to ensure that these packets can pass through your corporate firewall.

## DNS advantages

Using DNS provides several advantages over using IP addresses for access to the HCP system. For example:

- When you use a domain name for namespace access, the HCP DNS manager, which runs on all storage nodes, is responsible for distributing client requests among those nodes. If you use IP addresses, you are responsible for ensuring that the processing load is balanced across the HCP nodes.
- If an application uses a domain name for access to the HCP system and you change the IP addresses of the HCP nodes, you don't need to change the application. If the application uses IP addresses and you change the node IP addresses, you need to update the application to specify the new IP addresses.
- If both IPv4 and IPv6 addresses are defined for a front-end network, applications can use the domain name associated with that network to access the HCP system from client computers that have IPv4 addresses and from client computers that have IPv6 addresses. If an application uses IP addresses to access the HCP system over a front-end network with multiple IP addresses defined for each node, you need to configure the application to access the HCP system using only the IP addresses that are routable from the client computer on which the application is running.
- If you use a domain name to identify the other system when you create a replication link and the IP addresses for that domain are changed on that system, replication continues without interruption. If you use IP addresses to identify the system and the IP addresses for the system

change, replication stops until you change the IP addresses in the definition of the replication link.

- If you use domain names to identify the systems in a replication topology and you enable DNS failover on those systems, client requests can be automatically redirected to other systems in the topology if the target system fails. If you use IP addresses to identify a system in a replication topology and that system fails, client requests that target that system cannot be automatically redirected to other systems.

## Zones

The domain names resolved by DNS are divided into **zones**, where each zone is defined by set of related hostnames. A corporate domain, for example, is associated with a zone.

Each domain you define in HCP is a subdomain of a higher-level domain. In the DNS, you need an HCP domain definition for each combination of network and domain you define in HCP. The IP addresses for each HCP domain in the DNS make up a zone within the zone for the applicable higher-level domain.

For example, suppose that you configure HCP to define two domains, hcp-ma.example.com and hcp-ca.example.com. Suppose also that you configure HCP to define three user-defined networks, net1, net2, and net3, and you configure these three networks to associate net1 and net2 with domain hcp-ma.example.com and associate net3 with domain hcp-ca.example.com. In this case, you need to add three zones to the DNS, one for each of these domain and network combinations:

Domain name: hcp-ma.example.com  
Node IP addresses defined for network net1

Domain name: hcp-ma.example.com  
Node IP addresses defined for network net2

Domain name: hcp-ca.example.com  
Node IP addresses defined for nodes in network net3

## Secondary zones and stub zones

In the DNS, you configure each HCP domain as a **secondary zone** (also called a **slave zone**) or as a **stub zone**. A DNS server in which a given HCP domain is configured as a secondary zone maintains a full copy of the HCP DNS information for that domain and can, therefore, satisfy requests for resolution of the HCP domain name by itself. You might use secondary zones, for example, if the firewall that HCP sits behind is configured to allow client requests for DNS name resolution to go only to a corporate DNS server.

A DNS server in which a given HCP domain is configured as a stub zone gets only partial DNS information for that domain from HCP. Stub zones minimize zone replication and are less resource intensive for the DNS server.

If you enable hidden master or notify for a network, the HCP domain for that network must be configured as a secondary zone, not a stub zone, on each DNS server specified in the network configuration.

Secondary zone and stub zone definitions are basically the same. Each definition lists the IP addresses of master name servers for a domain but does not include individual records for those servers. Those records are stored on the master name servers themselves. The DNS servers get the individual name server records from the master name servers listed in the zone definition.

For each network defined in HCP, HCP automatically generates name server records for all storage nodes that have IP addresses in that network. Each of those storage nodes stores a copy of these records, thereby making each storage node eligible to be a master name server for the applicable domain.

Before HCP can accept client requests that identify the system by a domain name, you need to register some or all of the eligible nodes as master name servers for the applicable HCP secondary zone or stub zone. You register a node by listing its IP addresses in the secondary zone or stub zone definition.

For any given HCP domain, all storage nodes with IP addresses defined for the applicable network can act as name servers for the HCP DNS manager, regardless of whether they're registered as master name servers. However, for HCP to be accessible over that network, at least one registered node

must be running. Therefore, you need to register a sufficient number of nodes for each network to minimize the risk that all registered nodes for a given network will fail at the same time.



**Tip:** If HCP has a small number of storage nodes, consider registering them all as master name servers. The more nodes you register, the more distributed the DNS queries will be.

When defining a secondary zone or stub zone for an HCP domain, you specify a fully qualified domain name for the HCP system. This is the name of the domain associated with the network that is defined in HCP.

## Configuring an HCP secondary zone or stub zone in Windows

You can use either the GUI or a command line to configure a secondary zone or stub zone in Windows. The following sections present the GUI configuration procedure for Windows. For information about which Windows servers are supported, check the HCP release notes for the version of HCP that you have installed.

### Configuring an HCP secondary zone in Windows

To configure an HCP domain as a secondary zone in Windows:

1. Open the DNS manager:
  - a. In the Windows Control Panel, double-click **Administrative Tools**.
  - b. In the **Administrative Tools** window, double-click **DNS**.

The **DNS Manager** window shows the hierarchy of zones currently defined in the DNS.

2. In the **DNS Manager** window, right-click **Forward Lookup Zones** under the higher-level zone within which you want to configure the HCP secondary zone. On the dropdown menu, select **New Zone**.

The **New Zone Wizard** window opens.

3. In the **New Zone Wizard** window, click **Next**.
4. On the **Zone Type** page, select **Secondary zone**. Then click **Next**.

5. In the **Zone name** field on the **Zone Name** page, type the applicable fully qualified domain name for the HCP system. Then click **Next**.
6. On the **Master DNS Servers** page, for each HCP storage node you want to register as a master name server, in the list box, type the IPv4 and IPv6 addresses assigned to the node for the applicable network. Then press Enter.

When you're finished adding all the node IP addresses, click **Next**.

7. Click **Finish**.

The HCP new secondary zone appears in the zone hierarchy in the DNS manager window.

## Configuring an HCP stub zone in Windows

To configure an HCP domain as a stub zone in Windows:

1. Open the DNS manager:
  - a. In the Windows Control Panel, double-click **Administrative Tools**.
  - b. In the **Administrative Tools** window, double-click **DNS**.

The **DNS Manager** window shows the hierarchy of zones currently defined in the DNS.

2. In the **DNS Manager** window, right-click **Forward Lookup Zones** under higher-level zone within which you want to configure the HCP stub zone. On the dropdown menu, select **New Zone**.

The **New Zone Wizard** window opens.

3. In the **New Zone Wizard** window, click **Next**.
4. On the **Zone Type** page, select **Stub zone**.
5. Take one of these actions:
  - To configure the stub zone with Windows Active Directory integration:
    - a. Select **Store the zone in Active Directory**.

- b. On the **Active Directory Zone Replication Scope** page, select the option for the way in which you want DNS data to be replicated throughout your network.

Then click **Next**.



**Note:** You need to configure the stub zone with Windows Active Directory integration if you plan to enable HCP support for AD. For information about doing that, see [Configuring Active Directory or Windows workgroup support](#).

- To configure the stub zone without Windows Active Directory integration, click **Next**.
6. In the **Zone name** field on the **Zone Name** page, type the applicable fully qualified domain name for the HCP system. Then click **Next**.
  7. On the **Zone File** page, select **Create a new file with this file name** and leave the default file name in the accompanying field. Then click **Next**.
  8. On the **Master DNS Servers** page, for each HCP storage node you want to register as a master name server, in the list box, type the IPv4 and IPv6 addresses assigned to the node for the applicable network. Then press Enter.

When you're adding all the node IP addresses, click **Next**.

9. Click **Finish**.

The HCP new stub zone appears in the zone hierarchy in the DNS manager window.

## Configuring an HCP secondary zone or stub zone in Unix

With BIND in Unix, zones are defined in the `/etc/named.conf` file on the DNS servers. In the definition of a secondary zone or stub zone for an HCP domain, you specify:

- The applicable fully qualified domain name for the HCP system
- The zone type (**slave** for a secondary zone or **stub** for a stub zone)
- The name of the file you want the system to use to cache DNS query results for faster lookup



- A list of the IP addresses of the master name servers for the secondary zone or stub zone (be sure to use all of the node IP addresses assigned to each node for the applicable network)

Here's a sample zone statement that defines a secondary zone for an HCP domain with the domain name `hcp-ma.example.com` and four registered master name servers:

```
zone "hcp-ma.example.com" IN {
    type slave;
    file "/var/named/slave/hcp-ma.example.com";
    masters
    {192.168.210.15;192.168.210.16;192.168.210.17;192.168.210.18;2001:0db8::101;
    2001:0db8::102;2001:0db8::103;2001:0db8::104; };
};
```

Here's a sample zone statement that defines a stub zone for the same domain:

```
zone "hcp-ma.example.com" IN {
    type stub;
    file "/var/named/stub/hcp-ma.example.com";
    masters
    {192.168.210.15;192.168.210.16;192.168.210.17;192.168.210.18;2001:0db8::101;
    2001:0db8::102;2001:0db8::103;2001:0db8::104;};
};
```

## Verifying the configuration

You can verify that an HCP secondary zone or stub zone is working properly from either a Windows command-prompt window or a Unix shell. In both cases, you use either the **dig** or **nslookup** command, depending on which is available. The syntax for this is:

```
dig|nslookup (admin|nfs|cifs|www) .hcp-domain-name
```

The response to this command should be a list of the IP addresses of all the HCP storage nodes that have IP addresses defined for the network for which the secondary zone or stub zone is defined.

Here's an example of the output from the `nslookup` command when six out of the ten nodes in the network are registered as master name servers for the secondary zone or stub zone:

```
# nslookup www.hcp-ma.example.com
Server: adc1850.example.com
Addresses: 192.168.80.45
2001:0db8::201
```

```
Name: www.hcp-ma.example.com
Addresses: 192.168.210.11, 2001:0db8::101, 192.168.210.12, 2001:0db8::102,
192.168.210.13, 2001:0db8::103, 192.168.210.14, 2001:0db8::104, 192.168.210.15,
2001:0db8::105, 192.168.210.16, 2001:0db8::106, 192.168.210.17, 2001:0db8::107,
192.168.210.18, 2001:0db8::108, 192.168.210.19, 2001:0db8::109, 192.168.210.20,
2001:0db8::10a
```

If you don't see the expected node list, the secondary zone or stub zone is not defined correctly.

## DNS considerations for service by remote systems

When you configure a secondary zone or stub zone for an HCP system, you specify a domain name and the IP addresses of the master name servers for the applicable HCP domain. This causes client requests that identify the system by that domain name to be forwarded to those master name servers.

Namespaces can be configured to accept client requests on HCP systems other than the system targeted by the request when that system is unavailable. To enable this redirection to occur automatically for a namespace:

- DNS failover must have been enabled on the target system.
- The applicable replication link must be failed over. The applicable replication link is the link between the target system and the system to which requests should be redirected.
- The applicable secondary zone or stub zone for the target system must include the IP addresses of the applicable master name servers for the system to which requests should be redirected, where:
  - The applicable secondary zone or stub zone on the target system is the one defined for the data network for the tenant that owns the namespace

- The applicable master name servers for the system to which requests should be redirected are the ones included in the secondary zone or stub zone for the network with the same name as the tenant data network on the target system

For example, suppose:

- The data network for a tenant is the network named net1.
- The system targeted by a client request has master name servers with IPv4 addresses 192.168.210.15, 16, 17, and 18 and with IPv6 addresses 2001:0db8::101, 102, 103, and 104 for net1.
- The system to which requests should be redirected has master name servers with IPv4 addresses 192.168.24.72, 73, 74, and 75 and with IPv6 addresses 2001:0db8::201, 202, 203, and 204 for net1.

In this case, the secondary zone or stub zone for net1 on the target system would have these IP addresses:

192.168.210.15  
2001:0db8::101  
192.168.210.16  
2001:0db8::102  
192.168.210.17  
2001:0db8::103  
192.168.210.18  
2001:0db8::104  
192.168.24.72  
2001:0db8::201  
192.168.24.73  
2001:0db8::202  
192.168.24.74  
2001:0db8::203  
192.168.24.75  
2001:0db8::204

The secondary zone or stub zone for net1 on the system to which requests should be redirected would have these IP addresses:

```
192.168.24.72
2001:0db8::201
192.168.24.73
2001:0db8::202
192.168.24.74
2001:0db8::203
192.168.24.75
2001:0db8::204
```

To enable redirection in both directions between two HCP systems that participate in an active/active replication link, the secondary zone or stub zone for each of the systems must include the IP addresses of the master name servers for the other system.

To enable client requests targeted to one system to be serviced by any of the other systems in a replication topology, the secondary zone or stub zone for that system must include the IP addresses of the master name servers for each of the other systems.

For example, suppose a replication topology includes systems A, B, C, and D. For systems B, C, and D to be able to service requests targeted to system A, the secondary zone or stub zone for system A must include the IP addresses of the master name servers for systems B, C, and D. For systems C, D, and A to be able to service requests targeted to system B, the secondary zone or stub zone for system B must include the IP addresses of the master name servers for systems C, D, and A.



---

**Note:** If you are not enabling DNS failover on an HCP system, do not include IP addresses for the master name servers for other systems in the secondary zones or stub zones for that system.

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