Hitachi Content Platform

v9.2.3

Installing an HCP RAIN System - Final On-site Setup

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

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Contents

Preface

This book is the final on-site setup guide for Hitachi Content Platform (HCP) systems that run on a redundant array of independent nodes (HCP RAIN). It provides all the information you need to deploy an assembled and configured HCP RAIN system at your site. It also contains instructions for assembling the components of an HCP RAIN system that was ordered without a rack. Additionally, it explains how to configure Hitachi Remote Ops to monitor the nodes in the HCP system.

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.

Intended audience

This book is intended for the people at a customer site who are responsible for the on-site setup of an HCP RAIN 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.x or later of Hitachi Content Platform.

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 the Hitachi Vantara Support Website: https://knowledge.hitachivantara.com/Documents.

Related documents

- *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 delete objects, as well as change 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.

- Installing an HCP SAIN System - Final On-site Setup

  This book contains instructions for deploying an assembled and configured single-rack HCP SAIN system at a customer site. It explains how to make the necessary physical connections and reconfigure the system for the customer computing environment. It also contains instructions for configuring Hitachi Remote Ops to monitor the nodes in an HCP system.

Accessing product documentation

Product user documentation is available on the Hitachi Vantara Support Website: 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

The Hitachi Vantara Support Website is the destination for technical support of products and solutions sold by Hitachi Vantara. To contact technical support, log on to the Hitachi Vantara Support Website for contact information: https://support.hitachivantara.com/en_us/contact-us.html.

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Thank you!

Chapter 1: HCP RAIN 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 HCP RAIN system, also referred to for this current generation of hardware as an HCP G11 with Local 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 RAIN systems
- An overview of the final setup activities required to make your HCP G11 with Local Storage operational at your site

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.

Introduction to Hitachi Content Platform

HCP is a combination of hardware and software that provides an objectbased 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 RAIN system hardware

HCP RAIN system hardware consists of:

- Nodes with internal 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 RAIN system are HCP G11 servers.
- HCP S Series Nodes. The possible node models are:
  - S11
  - S31
- Ethernet switches and cables for networking. The switches in an HCP G11 with Local Storage can be for one or ten gigabyte back-end network configurations. The possible switch models are:
  - Supported one gigabyte switch:
    - Brocade ICX 6430
  - Supported ten gigabyte switches:
    - Brocade VDX 6740
    - Cisco Nexus 5548UP
    - Cisco Nexus 5596UP
  - Additional infrastructure items such as a rack and Power Distribution Units (PDUs).

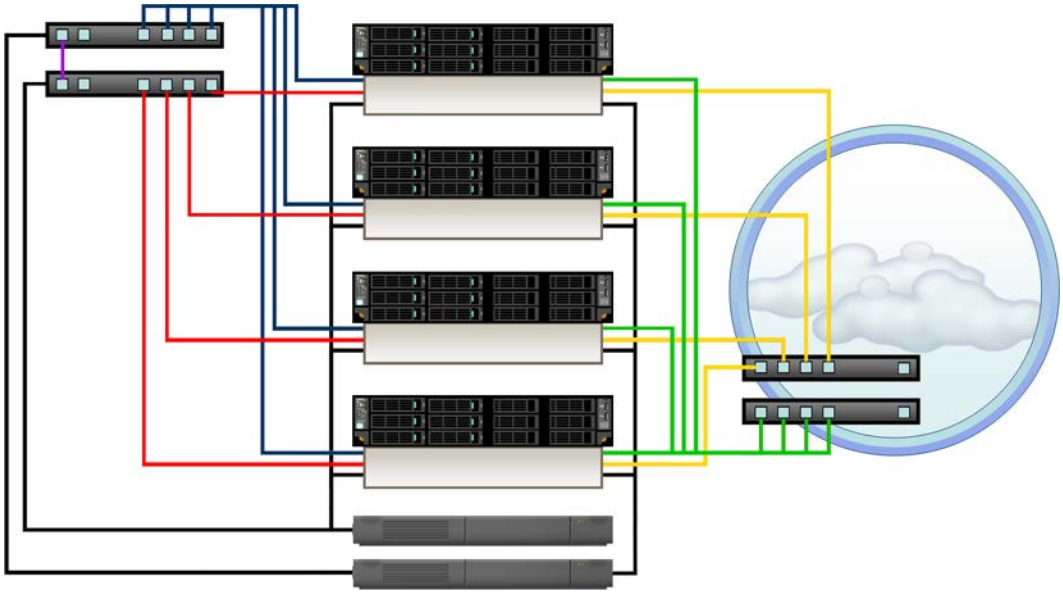
An HCP system uses a back-end network, front-end network, and, in certain configurations, a management network. The isolated back-end network connects the HCP nodes to each other through one or two Ethernet switches, depending on your network configuration and switch model. Each node has a pair of bonded 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 RAIN 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 following figure shows the standard architecture of an HCP RAIN system. This system has four nodes, two back-end switches (on the left), and two front-end switches (on the right).



The following table 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

Cable	Connects from	Connects to
Green and yellow Ethernet	Front-end NICs in each node	Front-end switches
Purple Ethernet	Back-end switches	Each other
Black power	Each node	Two PDUs
	Each Back-end switch	One PDU

Final on-site setup activities

An HCP RAIN 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 list below.

1. Verify that your site is ready for the HCP system to be installed.
2. Unpack and assemble.
   - For a preassembled system, remove the racked HCP system from the packing crate and position it in your data center.
   - For a rackless system, assemble the HCP system components in a rack that you supply.
3. Connect the HCP PDUs to your power sources.
4. Reconfigure the HCP system for your environment.
5. Connect the HCP system to your corporate network.

   Note: If the preconfigured front-end IP addresses do not work for your environment, perform step 6 below before performing this step.
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.
7. (Optional) Configure Hitachi Remote Ops to monitor the HCP nodes.

Chapter 2: Site preparation

Before an HCP RAIN 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 RAIN system.

Server specifications

An HCP G11 with Local 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
- 4-16 16GB DIMMs or 2-16 32GB DIMMs (64GB-512GB)
- 1 Intel i350 dual-port 1G OCP card
- 1 LSI 3108 RAID mezzanine card
- 1 LSI CacheVault module
- 1 SATA 2.5" drive cage

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 card
- 2 800GB or 1.9TB 2.5" enterprise SATA SSDs

Mechanical details

The following sections describe the mechanical specifications and requirements for a node.

Dimensions

The table below shows the physical dimensions of the node.

The labels in the figure below identify the faces of the 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	29.33	745
Total depth - front surface of handles to rear tab on power supply	32.28	820
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 a HCP G11 Node and a HCP G11 Node system.

Servers with HDDs

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
HCP G11 Node local storage base unit — includes enclosure, mounting rails, motherboard, drive backplane, riser card, two power supplies, four 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, 10Gb dual-port Ethernet PCIe card, and two power cables.	1	54.01 (24.55)	54.01 (24.55)
16GB DIMM or 32GB DIMM	2	0.15 (0.0675)	0.3 (0.135)
4TB HDD - optional for local storage model only	6	1.4 (0.635)	8.4 (3.81)
800GB SSD or 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)

Servers with all SSDs

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
HCP G11 Nodelocal 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, and two power cables.	1	54.01 (24.55)	54.01 (24.55)
Dual-port 10Gb Ethernet PCIe card — optional	1	0.59 (0.27)	0.59 (0.27)

Ethernet Switches

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
Brocade ICX 6430 (1Gb small)	2	7.57 (3.44)	15.14 (6.88)
HP 4208VL (1Gb large)	1	37.58 (17.08)	37.58 (17.08)
Brocade VDX 6740 (10Gb small)	2	19.05 (8.66)	38.1 (17.32)
Cisco Nexus 5548 (10Gb small)	2	34.97 (15.88)	69.94 (31.76)
Cisco Nexus 5596 (10Gb large)	2	47.41 (21.55)	94.82 (43.1)

Cables

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
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)

Hitachi Universal V3 Rack and PDU

See https://knowledge.hitachivantara.com/Documents/Storage/Universal_Rack.

Hitachi Universal V2B Rack and PDU

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
Hitachi Universal V2B Rack - includes two side panels, rear door, and accessory kit	1	225 (102.3)	225 (102.3)
1P32A-9C13-3C19C E.P	6	7.05 (3.2)	42.3 (10.24)

Item	Quantity	Unit weight lbs (kg)	Extended weight lbs (kg)
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)
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 V3 Rack

For the physical dimensions of the Hitachi Universal V3 Rack used when the node is purchased with this rack, see https://knowledge.hitachivantara.com/Documents/Storage/Universal_Rack.

Hitachi Universal V2B Rack

The table below shows the physical dimensions of the Hitachi Universal V2B Rack used when the node is purchased with this rack.

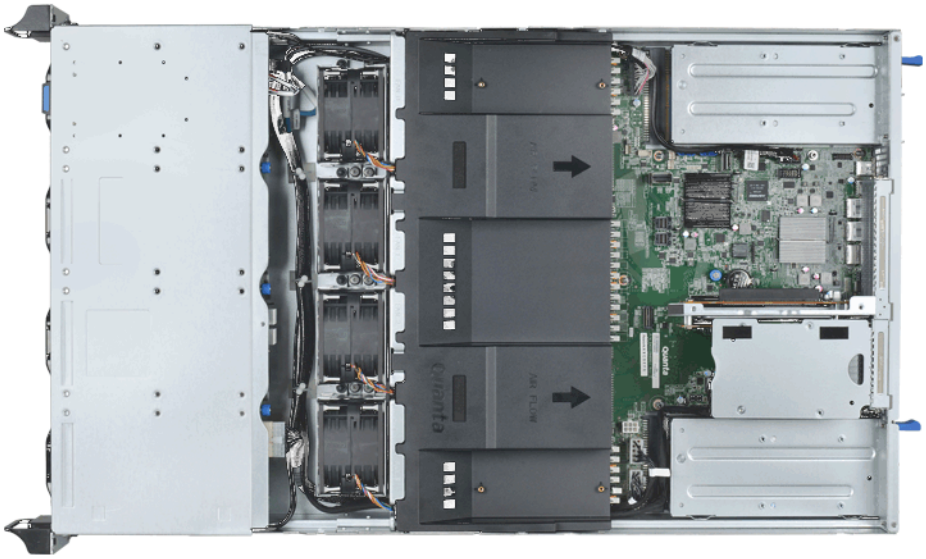
Parameter	Inches	Millimeters
Width	23.63	600
Depth	47.25	1200
Height	79.06	2008

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 youare 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.

  See the following table for the appropriate outlets required for each HCP system component.

Component	#of U	# of Outlets	Outlet Type
Brocade VDX 6740 10Gb Ethernet	1	2	C13
Cisco Nexus 5548 10Gb Ethernet	1	2	C13
Cisco Nexus 5596 10Gb Ethernet	2	2	C13

- For power requirements of each device, see Electrical requirements (on page 21) .
- For storage components, including HCP S11, 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.

PDU for the Hitachi Universal V3 Rack

For information about the PDU power system requirements for the Hitachi Universal V3 Rack, see https://knowledge.hitachivantara.com/Documents/Storage/Universal_Rack.

PDU for the Hitachi Universal V2B Rack

The following table shows the power system requirements for the PDU used with the Hitachi Universal V2B Rack.

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 V2B Rack and Hitachi Universal V2B Rack differ by geography and input phase:

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.

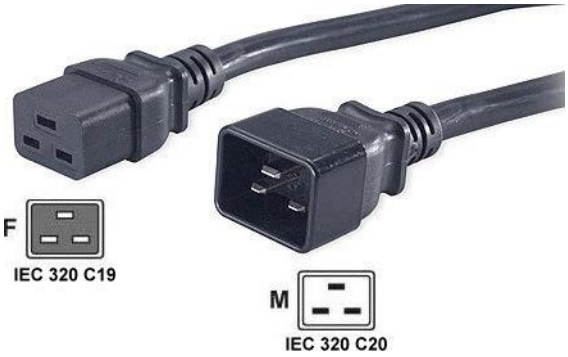
EMEA/APAC

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

The three-phase, 400V, 32A PDUs have an IEC 320 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.

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
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.

Component	Nominal amperage @ 208V (A)	Nominal wattage @ 208V (W)
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

RoHS compliance

An HCP 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%
HP 4208VL	0°C to 40°C (32°F to 104°F)	15%-95%-	0-4600m (0-15,000 feet)	-40°C to 70°C (-40°F to 158°F)	15%-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%
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%

Component	Operating temperature *	Operating humidity (non-condensing)	Altitude	Non-operating temperature	Non-operating humidity (non-condensing)
* 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			
HP 4208VL	N/A	N/A	N/A	N/A
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

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)
HP 4208VL	2152	64.2
Brocade VDX 6740	597	63.1
Cisco Nexus 5548	1331	N/A
Cisco Nexus 5596	2252	N/A
Brocade 6510	20G, 6ms, half-sine	33G, 11ms, half-sine, 3/eg axis
Cisco MDS 9148S	183	60

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 overtemperature 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
- ¼-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

Chapter 3: Mounting unracked components

The components of an unracked system are delivered configured but not installed in a rack. You need to provide some additional components for installing the system in a rack at your site. This chapter provides instructions for doing this.

Components that come with a rackless system

For a rackless system, the following components are shipped to your site:

- The required numbers of nodes, with the HCP software already installed.
- **Note:** Do not add the same number of nodes, or more nodes, than you have in your cluster; otherwise, it causes a node outage due to metadata rebalancing.
- 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.

- 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 power cords for the nodes, 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.

> **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.

Hardware assembly procedure

To assemble the HCP system:

1. Prepare the rack for installation of the HCP system components.
2. Attach the HCP G11 Node System serial number sticker.
3. Install the PDUs in the rack.
4. (Optional) Rack the HCP S11 Nodes.
5. Rack the HCP G11 Node Nodes.
6. Rack the Ethernet switches.
7. (Optional) Cover the unused rack units with blanking pates.
8. Reassemble the rack.

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 Node 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 or in an appliance configuration with Ethernet switches and optional HCP S11 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 Gx00 models or S11 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 Gx00 models arrays or S11 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.

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

PDUs for the Hitachi Universal V3 Rack

Outlet layout

The PDU for the Hitachi Universal V3 Rack has three color-coded sections: blue, brown, 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 (brown), 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

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: 20A
- Number of C13 outlets: 8C13, 9C13, 10C13, 15C13, or 24C13
- Number of C19 outlets: 2C19, 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 30, 15 C13 outlets, and three C19 outlets is 3P30A-15C13-3C19-UL20A.P.

Not all possible part numbers are used. For example, no PDU has the part number 3P10A-10C13-3C19-UL20A.P.

PDUs for the Hitachi Universal V2B Rack

Outlet layout

The PDU for the Hitachi Universal V2B Rack 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

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 Node system, select the diagram for each system individually.

To select a diagram for an HCP system:

Procedure

1. In the packing list, see the "Configuration Parameters" section for the HCP system configuration.
   - If the system configuration is "HCP G11 Node rack: Non-appliance configuration," see HCP G11 Node Base and Expansion diagrams
   - If the system configuration is "HCP G11 Node rack: Appliance configuration (combine HCP G11 Node and S11/VSP)" and the system does not include any HCP G11 Node Nodes, see HCP G11 Node Appliance with VSP Gx00 models
   - If the system configuration is "HCP G11 Node rack: Appliance configuration (combine HCP G11 Node and S11/VSP)" and system includes one, two, or three HCP G11 Node Nodes, see HCP G11 Node Appliance with S11 and Optional VSP Gx00 models
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
   - "G11 rack: Install PDU with cables orientated towards floor," use Three-phase Americas (3P30A-24C13-6C19UL) – Bottom power

   For example, use HCP G11 Base and Expansion with Three-phase Americas (3P30A-24C13-6C19UL) – Top power 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, brown, and yellow for the Universal V3 Rack or blue, red, and yellow for the Universal V2 Rack — 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.

Hitachi Universal V3 Rack diagrams

The Hitachi Universal V3 Rack diagrams include the following.

- Rack-mounting an HCP G11.
- Rack-mounting an HCP G11 appliance with a virtual storage platform (VSP) G series storage system.
- Rack-mounting an HCP G11 with S1 or S3 nodes and optional VSP G series storage system.
- Rack-mounting an HCP G11 with S1 or S3 nodes.

Rack-mounting an HCP G11

The following figure shows the layout for mounting an HCP G11 base and expansion system and switches in the Universal V3 Rack. In this figure, the rack contains double PDUs:

- Two individual PDUs supply the top power.
- Two individual PDUs supply the bottom power.

In this figure, the PDUs used are either:

- Single-phase 1P30A-10C13-2C19-UL20A.P (Americas)
- Single-phase 1P32A-10C13-2C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U18, U25, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.

HCP G11 Base and Expansion								
1P30A-10C13-2C19-UL20A.P PDUs (Single-phase AMER)								
1P32A-10C13-2C19-CE20A.P PDUs (Single-phase EMEA/APAC)								
			Base 1/10G 1U Switch	Base 1/10G 2U Switch	Expansion			
Left PDUs		U#	HARDWARE			U#	Right PDUs	
UPPER		U42	Empty	Empty	Empty	U42		UPPER
	R1C13-4	U41				U41	R1C13-4	
		U40		Ethernet Switch		U40		
	R1C13-3	LU39				LU39	R1C13-3	
		U38		Ethernet Switch		U38		
	R1C13-2	U37				U37	R1C13-2	
		U36	(If present) HCP G11 or FCS			U36		
	R1C13-1	U35				U35	R1C13-1	
		U34	(If present) HCP G11 or FCS			U34		
	B1C13-4	U33				U33	B1C13-4	
		U32	(If present) HCP G11 or FCS			U32		
	B1C13-3	U31				U31	B1C13-3	
		U30	(If present) HCP G11 or FCS			U30		
	B1C13-2	U29				U29	B1C13-2	
		U28	(If present) Fibre Channel Switch			U28		
PWR	B1C13-1	U27	(If present) Fibre Channel Switch — C13-C20 Cable			U27	B1C13-1	PWR
MIDDLE	R1C13-3	U26	Ethernet Switch	Empty	Empty	U26	R1C13-3	MIDDLE
	R1C13-2	LU25	Ethernet Switch			LU25	R1C13-2	
		U24	(If present) HCP G11 or FCS			U24		
	R1C13-2	U23				U23	R1C13-2	
		U22	(If present) HCP G11 or FCS			U22		
	R1C13-1	U21				U21	R1C13-1	
		U20	(If present) HCP G11 or FCS			U20		
	B1C13-4	U19				U19	B1C13-4	
		LU18	(If present) HCP G11 or FCS			LU18		
	B1C13-3	U17				U17	B1C13-3	
		U16	(If present) HCP G11 or FCS			U16		
	B1C13-2	U15				U15	B1C13-2	
		U14	(If present) HCP G11 or FCS			U14		
PWR	B1C13-1	U13				U13	B1C13-1	PWR
PWR		U12	(If present) HCP G11 or FCS			U12		PWR
LOWER	B1C13-1	U11				U11	B1C13-1	LOWER
		U10	(If present) HCP G11 or FCS			U10		
	B1C13-2	U09				U09	B1C13-2	
		U08	HCP G11			U08		
	R1C13-2	U07				U07	R1C13-2	
		U06	HCP G11			U06		
	R1C13-3	U05				U05	R1C13-3	
		LU04	HCP G11			LU04		
	R1C13-4	U03				U03	R1C13-4	
		U02	HCP G11			U02		
	R1C13-5	U01				U01	R1C13-5	

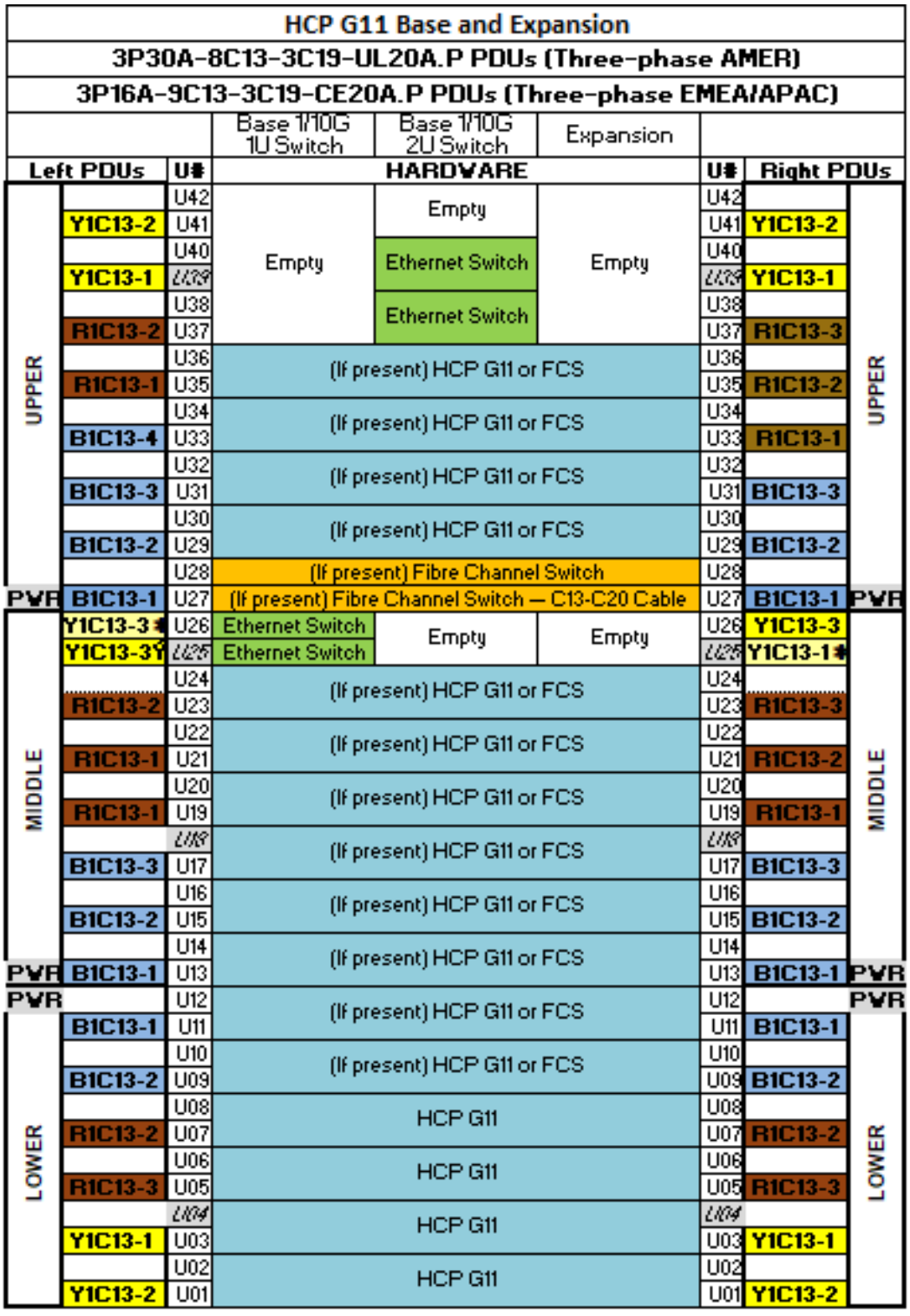
The following figure shows the layout for mounting an HCP G11 base and expansion system and switches in the Universal V3 Rack. In this figure, the rack contains double PDUs:

- Two individual PDUs supply the top power.
- Two individual PDUs supply the bottom power.

In this figure, the PDUs used are either:

- Three-phase 3P30A-8C13-UL20A.P (Americas)
- Three-phase 3P16A-9C13-3C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U18, U25, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.



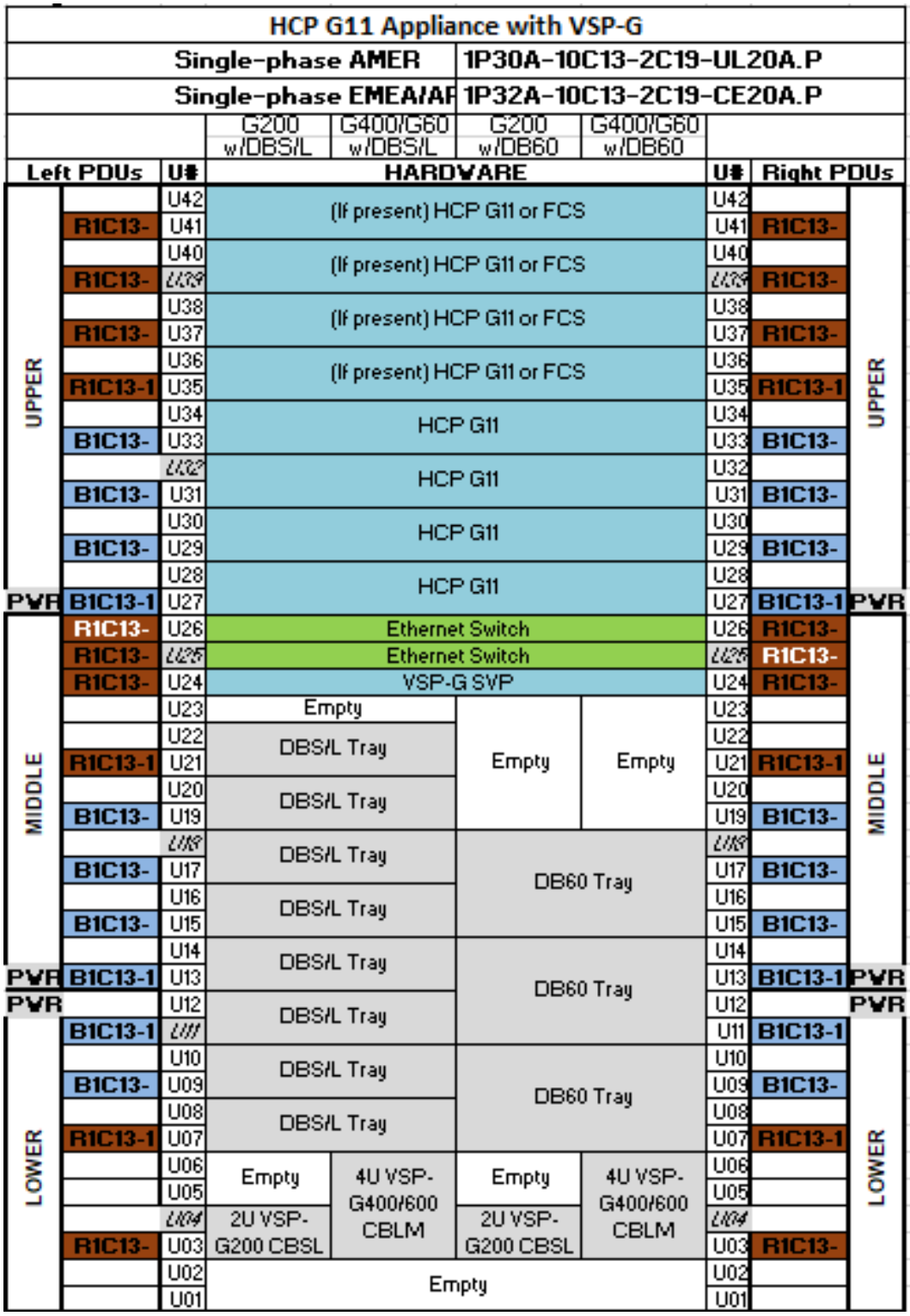
Rack-mounting an HCP G11 appliance with a Virtual Storage Platform (VSP) G series storage system

The following figure shows the layout for mounting an HCP G11 appliance with a VSP G series storage system and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Single-phase 1P30A-10C13-2C19-UL20A.P (Americas)
- Single-phase 1P32A-10C13-2C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.



The following figure shows the layout for mounting an HCP G11 appliance with a VSP G series storage system and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Three-phase 3P30A-8C13-3C19-UL20A.P (Americas)
- Three-phase 3P16A-9C13-3C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.

HCP G11 Appliance with VSP-G									
Three-phase AMER					3P30A-8C13-3C19-UL20A.P				
Three-phase EMEA/AP					3P16A-9C13-3C19-CE20A.P				
			G200 w/DBS/L	G400/G60 w/DBS/L	G200 w/DB60	G400/G60 w/DB60			
Left PDUs		U#	HARDWARE				U#	Right PDUs	
UPPER		U42	(If present) HCP G11 or FCS				U42		UPPER
	Y1C13-2	U41					U41	Y1C13-2	
		U40	(If present) HCP G11 or FCS				U40		
	Y1C13-1	*U39*					*U39*	Y1C13-1	
		U38	(If present) HCP G11 or FCS				U38		
	R1C13-	U37					U37	R1C13-	
		U36	(If present) HCP G11 or FCS				U36		
	R1C13-	U35					U35	R1C13-	
		U34	HCP G11				U34		
	R1C13-1	U33					U33	R1C13-1	
		U32	HCP G11				U32		
	B1C13-	U31					U31	B1C13-	
		U30	HCP G11				U30		
	B1C13-	U29					U29	B1C13-	
		U28	HCP G11				U28		
PWR	B1C13-1	U27					U27	B1C13-1	PWR
MIDDLE	Y1C13-2*	U26	Ethernet Switch				U26	Y1C13-2	MIDDLE
	Y1C13-1	*U25*	Ethernet Switch				*U25*	Y1C13-1*	
	R1C13-	U24	VSP-G SVP				U24	R1C13-	
		U23	Empty		Empty	Empty	U23		
		U22	DBS/L Tray				U22		
	R1C13-	U21					U21	R1C13-	
		U20	DBS/L Tray				U20		
	R1C13-	U19					U19	R1C13-	
		U18	DBS/L Tray		DB60 Tray		*U18*		
	B1C13-	U17					U17	B1C13-	
		U16	DBS/L Tray				U16		
	B1C13-	U15					U15	B1C13-	
		U14	DBS/L Tray		DB60 Tray		U14		
PWR	B1C13-1	U13					U13	B1C13-1	PWR
PWR		U12	DBS/L Tray				U12		PWR
LOWER	B1C13-1	*U11*					U11	B1C13-1	LOWER
		U10	DBS/L Tray		DB60 Tray		U10		
	B1C13-	U09					U09	B1C13-	
		U08	DBS/L Tray				U08		
	R1C13-1	U07					U07	R1C13-1	
		U06	Empty	4U VSP-G400/600 CBLM	Empty	4U VSP-G400/600 CBLM	U06		
		U05					U05		
		U04	2U VSP-G200 CBSL		2U VSP-G200 CBSL		*U04*		
	Y1C13-1	U03					U03	Y1C13-1	
		U02	Empty				U02		
		U01					U01		

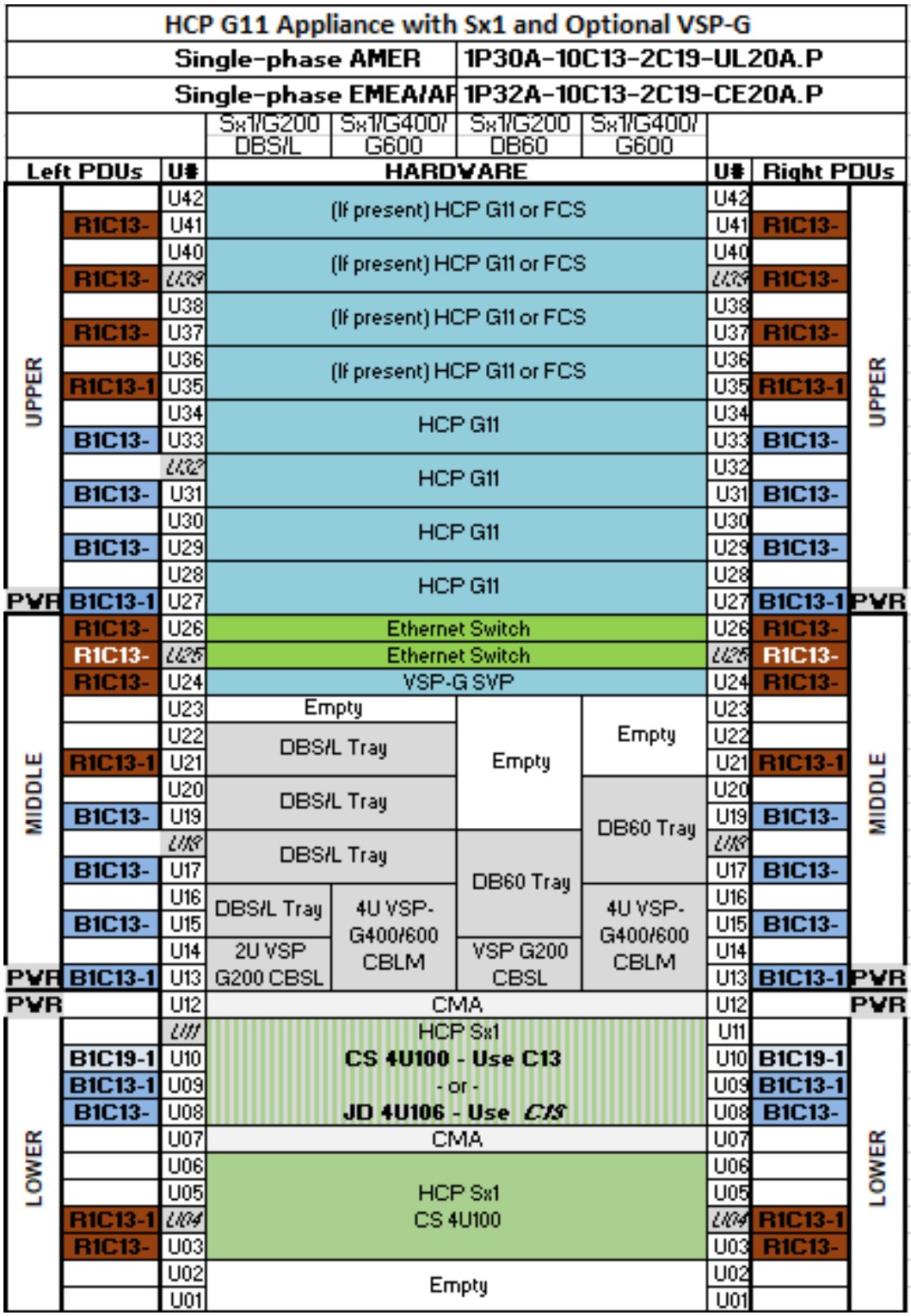
Rack-mounting an HCP G11 with S1 or S3 nodes and optional VSP G series storage system

The following figure shows the layout for mounting an HCP G11 appliance with an S1 or S3 node, an optional VSP G series storage system, and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Single-phase 1P30A-10C13-2C19-UL20A.P (Americas)
- Single-phase 1P32A-10C13-2C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.



The following figure shows the layout for mounting an HCP G11 appliance with S1 or S3 nodes, an optional VSP G series storage system, and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Three-phase 3P30A-8C13-3C19-UL20A.P (Americas)
- Three-phase 3P16A-9C13-3C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.

HCP G11 Appliance with Sx1 and Optional VSP-G									
Three-phase AMER				3P30A-8C13-3C19-UL20A.P					
Three-phase EMEA/AP				3P16A-9C13-3C19-CE20A.P					
			Sx1/G200 DBS/L	Sx1/G400/ G600	Sx1/G200 DB60	Sx1/G400/ G600			
Left PDUs		U#	HARDWARE				U#	Right PDUs	
UPPER		U42	(If present) HCP G11 or FCS				U42		UPPER
	Y1C13-2	U41					U41	Y1C13-2	
		U40	(If present) HCP G11 or FCS				U40		
	Y1C13-1	*U39*					*U39*	Y1C13-1	
		U38	(If present) HCP G11 or FCS				U38		
	R1C13-	U37					U37	R1C13-	
		U36	(If present) HCP G11 or FCS				U36		
	R1C13-	U35					U35	R1C13-	
		U34	HCP G11				U34		
	R1C13-1	U33					U33	R1C13-1	
		U32	HCP G11				U32		
	B1C13-	U31					U31	B1C13-	
		U30	HCP G11				U30		
	B1C13-	U29					U29	B1C13-	
		U28	HCP G11				U28		
PWR	B1C13-1	U27					U27	B1C13-1	PWR
MIDDLE	Y1C13-2*	U26	Ethernet Switch				U26	Y1C13-2	MIDDLE
	Y1C13-1	*U25*	Ethernet Switch				*U25*	Y1C13-1*	
	R1C13-	U24	VSP-G SVP				U24	R1C13-	
		U23	Empty		Empty	Empty	U23		
		U22	DBS/L Tray				U22		
	R1C13-	U21					U21	R1C13-	
		U20	DBS/L Tray			DB60 Tray	U20		
	R1C13-1	U19					U19	R1C13-1	
		U18	DBS/L Tray		DB60 Tray		*U18*		
	B1C13-	U17					U17	B1C13-	
		U16	DBS/L Tray	4U VSP-G400/600 CBLM		4U VSP-G400/600 CBLM	U16		
	B1C13-	U15					U15	B1C13-	
		U14	2U VSP G200 CBSL		VSP G200 CBSL		U14		
PWR	B1C13-1	U13					U13	B1C13-1	PWR
PWR		U12	CMA				U12		PWR
LOWER		*U11*	HCP Sx1				U11		LOWER
	R1C19-1	U10	**CS 4U100 - Use C13**				U10	R1C19-1	
	R1C13-1	U09	- or -				U09	R1C13-1	
	R1C13-	U08	**JD 4U106 - Use *CIS***				U08	R1C13-	
		U07	CMA				U07		
		U06	HCP Sx1 CS 4U100				U06		
		U05					U05		
	Y1C13-1	*U04*					*U04*	Y1C13-1	
	Y1C13-2	U03					U03	Y1C13-2	
		U02	Empty				U02		
		U01					U01		

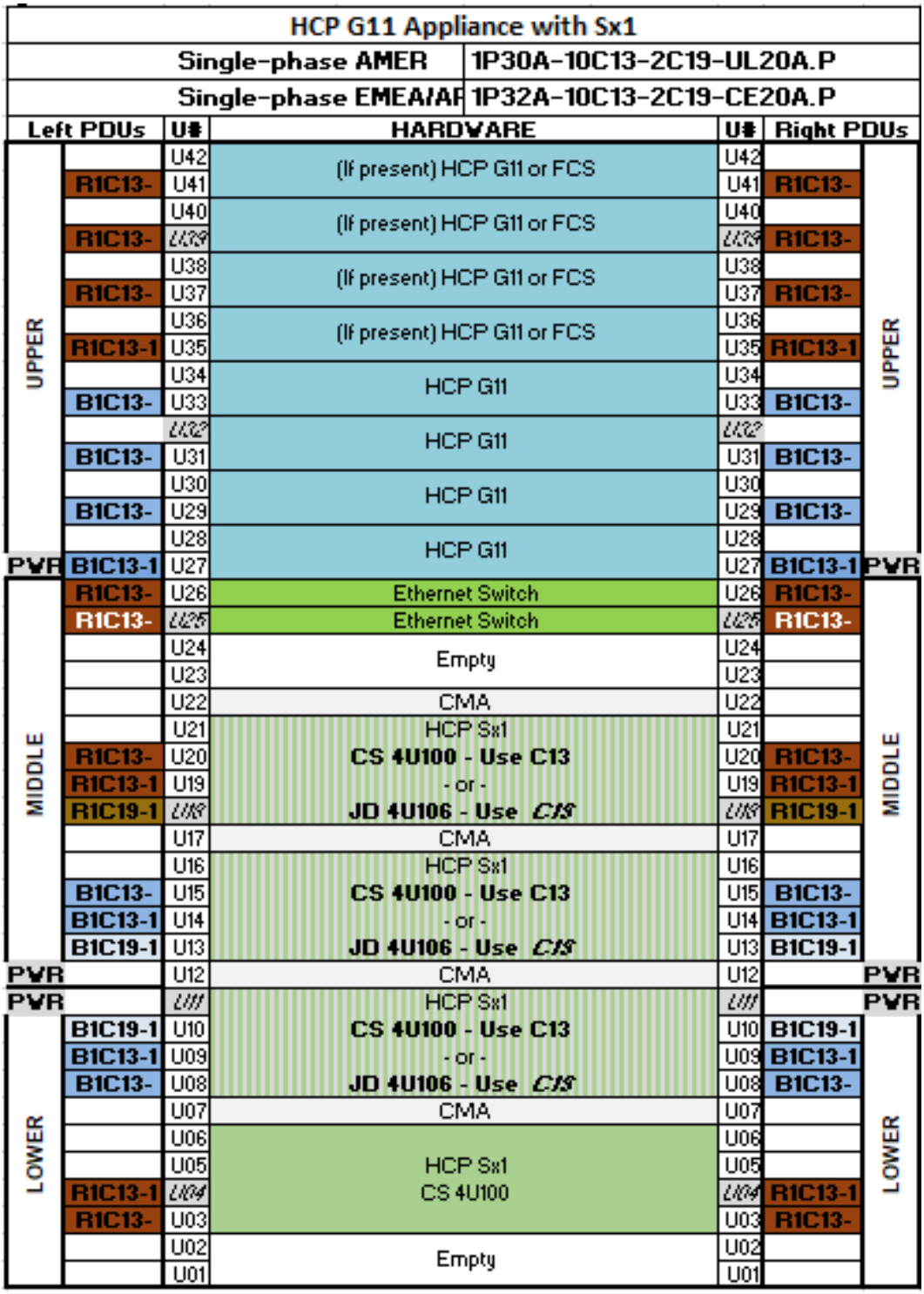
Rack-mounting an HCP G11 appliance with S1 or S3 nodes

The following figure shows the layout for mounting an HCP G11 appliance with S1 or S3 nodes and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Single-phase 1P30A-10C13-2C19-UL20A.P (Americas)
- Single-phase 1P32A-10C13-2C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.



The following figure shows the layout for mounting an HCP G11 appliance with S1 or S3 nodes and switches in the Universal V3 Rack.

In this figure, the PDUs used are either:

- Three-phase 3P30A-8C13-3C19-UL20A.P (Americas)
- Three-phase 3P16A-9C13-3C19-CE20A.P (EMEA and APAC)

Rack Unit numbers U04, U11, U18, U25, U32, and U39 — shown in shaded gray italics — indicate PDU bracket location. An asterisk denotes an outlet used only when the Ethernet switch has two power supplies.

HCP G11 Appliance with Sx1						
Three-phase AMER			3P30A-8C13-3C19-UL20A.P			
Three-phase EMEA/AP			3P16A-9C13-3C19-CE20A.P			
Left PDUs		U#	HARDWARE	U#	Right PDUs	
UPPER		U42	(If present) HCP G11 or FCS	U42		UPPER
	Y1C13-2	U41		U41	Y1C13-2	
		U40	(If present) HCP G11 or FCS	U40		
	Y1C13-1	*U39*		*U39*	Y1C13-1	
		U38	(If present) HCP G11 or FCS	U38		
	R1C13-	U37		U37	R1C13-	
		U36	(If present) HCP G11 or FCS	U36		
	R1C13-	U35		U35	R1C13-	
		U34	HCP G11	U34		
	R1C13-1	U33		U33	R1C13-1	
		U32	HCP G11	*U32*		
	B1C13-	U31		U31	B1C13-	
		U30	HCP G11	U30		
	B1C13-	U29		U29	B1C13-	
		U28	HCP G11	U28		
PWR	B1C13-1	U27		U27	B1C13-1	PWR
MIDDLE	Y1C13-2*	U26	Ethernet Switch	U26	Y1C13-2	MIDDLE
	Y1C13-1	*U25*	Ethernet Switch	*U25*	Y1C13-1*	
		U24	Empty	U24		
		U23		U23		
		U22	CMA	U22		
		U21	HCP Sx1	U21		
	R1C13-	U20	**CS 4U100 - Use C13**	U20	R1C13-	
	R1C13-1	U19	- or -	U19	R1C13-1	
	R1C19-1	*U18*	**JD 4U106 - Use *C19***	*U18*	R1C19-1	
		U17	CMA	U17		
		U16	HCP Sx1	U16		
	B1C13-	U15	**CS 4U100 - Use C13**	U15	B1C13-	
	B1C13-1	U14	- or -	U14	B1C13-1	
	B1C19-1	U13	**JD 4U106 - Use *C19***	U13	B1C19-1	
PWR		U12	CMA	U12		PWR
PWR		*U11*	HCP Sx1	*U11*		PWR
LOWER	R1C19-1	U10	**CS 4U100 - Use C13**	U10	R1C19-1	LOWER
	R1C13-1	U09	- or -	U09	R1C13-1	
	R1C13-	U08	**JD 4U106 - Use *C19***	U08	R1C13-	
		U07	CMA	U07		
		U06	HCP Sx1	U06		
		U05	CS 4U100	U05		
	Y1C13-1	*U04*		*U04*	Y1C13-1	
	Y1C13-2	U03		U03	Y1C13-2	
		U02	Empty	U02		
		U01		U01		

Hitachi Universal V2 Rack diagrams

The Hitachi Universal V2 Rack diagrams include the following.

- Single-phase Americas HCP G11 base and expansion rack.
- Three-phase EMEA/APAC HCP G11 base and expansion rack (bottom power).
- HCP G11 Appliance with VSP Gx00 models single- and three-phase Americas and EMEA/APAC.
- HCP G11 Appliance with S11 and Optional VSP Gx00 models single- and three-phase Americas and EMEA/APAC.
- HCP G11 Appliance with Sx1.

Single-phase Americas 1P30A-15C13-3C19UL and EMEA/APAC 1P32A-18C13-3C19CE

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		Ethernet switch		U40		
	Y1C13-5	U39				U39	Y1C13-5	
		U38		Ethernet switch		U38		
	Y1C13-4	U37				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**

* This outlet is used only when the Ethernet switch has two power supplies.

Three-phase EMEA/APAC 3P32A-24C13-6C19CE - Bottom power

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		Ethernet switch		U40		
	Y2C13-8	U39				U39	Y2C13-8	
		U38		Ethernet switch		U38		
	Y2C13-7	U37				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**

* This outlet is used only when the Ethernet switch has two power supplies.

HCP G11 Appliance with VSP Gx00 models single- and three-phase Americas and EMEA/APAC

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
	Y1C13-1	U25	Ethernet switch				U25	Y1C13-1*	
	R1C13-3	U24	SVP				U24	R1C13-3	
MIDDLE		U23	Empty		Empty	Empty	U23		MIDDLE
		U22	DBS/DBL Tray				U22		
	R1C13-2	U21					U21	R1C13-2	
		U20	DBS/DBL 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				U16		
	B1C13-2	U15					U15	B1C13-2	
		U14	DBS/DBL Tray		DB60 Tray		U14		
PWR	B1C13-1	U13					U13	B1C13-1	PWR
PWR		U12	DBS/DBL Tray				U12		PWR
LOWER	B1C13-1	U11					U11	B1C13-1	LOWER
		U10	DBS/DBL Tray		DB60 Tray		U10		
	B1C13-2	U9					U9	B1C13-2	
		U8	DBS/DBL Tray				U8		
	R1C13-1	U7					U7	R1C13-1	
		U6	Empty	4U controller	Empty	4U controller	U6		
		U5					U5		
		U4	2U controller		2U controller		U4		
	Y1C13-1	U3					U3	Y1C13-1	
		U2	Empty				U2		
		U1					U1		

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

* This outlet is used only when the Ethernet switch has two power supplies.

HCP G11 Appliance with S11 and Optional VSP Gx00 models single- and three-phase Americas and EMEA/APAC

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	Empty	U23		
		U22	DBS/DBL Tray				U22		
	R1C13-2	U21					U21	R1C13-2	
		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		4U Controller	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**

***** This outlet is used only when the Ethernet switch has two power supplies

HCP G11 Appliance with Sx1

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
		U24	Empty				U24		
		U23					U23		
		U22	CMA				U22		
		U21	HCP Sx1				U21		
	R1C13-2	U20	CS4U100 (use the C13 connector)				U20	R1C13-2	
	R1C13-1	U19	or				U19	R1C13-1	
	R1C19-1	U18	JD 4U106 (use the C19 connector)				U18	R1C19-1	
		U17	CMA				U17		
		U16	HCP Sx1				U16		
	B1C13-2	U15	CS4U100 (use the C13 connector)				U15	B1C13-2	
	B1C13-1	U14	or				U14	B1C13-1	
PWR	B1C19-1	U13	JD 4U106 (use the C19 connector)				U13	B1C19-1	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

* This outlet is used only when the Ethernet switch has two power supplies

Three-phase Americas 3P30A-24C13-6C19UL - Top power

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	Empty	U42		PWR
		U41				U41		
		U40		Ethernet switch		U40		
	B1C13-1	U39				U39	B1C13-1	
		U38		Ethernet switch		U38		
	B1C13-2	U37				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		
PDU	R1C13-4	U21				U21	R1C13-4	PDU
		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**

* This outlet is used only when the Ethernet switch has two power supplies.

Three-phase Americas 3P30A-24C13-6C19UL - Bottom power

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		Ethernet switch		U40		
	Y1C13-8	U39				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

* This outlet is used only when the Ethernet switch has two power supplies.

Three-phase EMEA/APAC 3P32A-24C13-6C19CE - Top power

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		PDU
		U40		Ethernet switch		U40		
	B1C13-1	U39				U39	B1C13-1	
		U38		Ethernet switch		U38		
	B1C13-2	U37				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**

* This outlet is used only when the Ethernet switch has two power supplies.

Considerations for racking nodes

An HCP G11 system can be racked with up to three HCP S11 Nodes in a single rack. If you are racking HCP S11 Nodes, you need to rack the S11 Nodes first at the bottom of the rack.

If the HCP system has more than three HCP S11 Nodes, the extra HCP S11 Nodes need to be racked in separate expansion racks. For more information about racking an HCP S11 Node expansion rack, see the *HCP S11 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. 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. HCP G11 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.

Tools and accessories you need

To assemble an HCP 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.

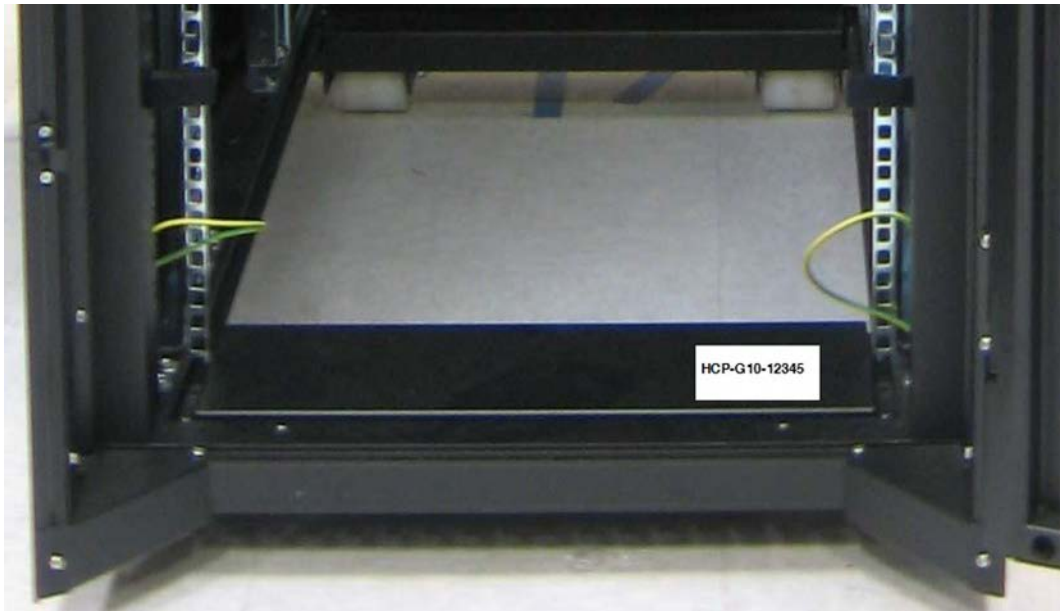
Prepare the racks

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

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.



Procedure

1. Locate the area where the sticker is to 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.

Install the PDUs

Install the PDUs in the rack.

For instructions on installing PDUs, see Considerations for HCP racking and PDU connections (on page 31) .

(Optional) Rack the HCP S11 Nodes

If the HCP system uses HCP S11 Nodes, you need to rack the S11 Nodes. This section describes how to rack the HCP S11 Nodes and connect them to the PDUs.

Rack the HCP S11 Nodes

Rack the HCP S11 Nodes in the rack.

For more information about which rack units to rack the HCP S11 Nodes in, see *Considerations for HCP racking and PDU connections*.

For more information about HCP S11 Node racking, see *Considerations for racking Nodes*.

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

Note: Do not add the same number of nodes, or more nodes, than you have in your cluster; otherwise, it causes a node outage due to metadata rebalancing.

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*.

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*.

Note: Do not add the same number of nodes, or more nodes, than you have in your cluster; otherwise, it causes a node outage due to metadata rebalancing.

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.

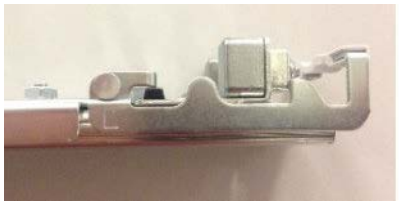
In a new server rail kit, the inner rails are nested inside the outer rails. You need to separate them so that you can attach the inner rails to the server and the outer rails in the rack.

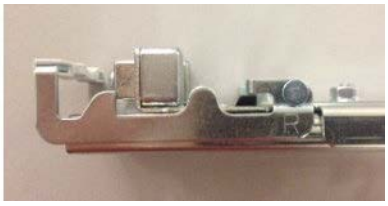
The following figure shows an inner rail nested inside an outer rail.

The following figure 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.

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.

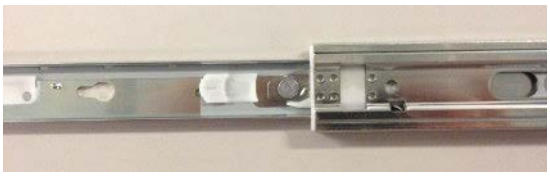




Procedure

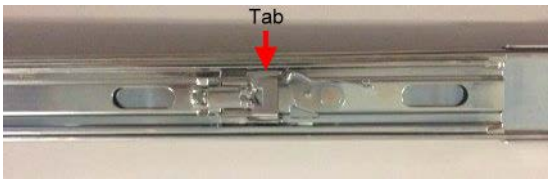
1. Slide the inner rail out of the outer rail toward the front until it locks into place.
   The inner part of the outer rail slides also slides out.

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.



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.

Procedure

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.

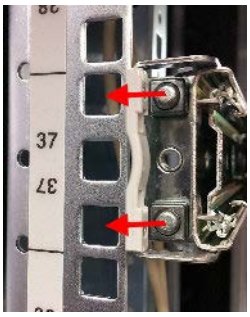
Install the outer server rails in the rack

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.

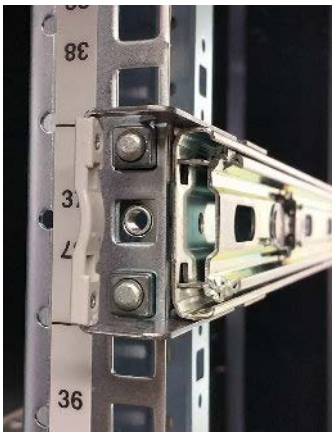
The outer rails are installed in the lower of the two rack units the server will occupy. For example, if the server will occupy rack units 37 and 38, the outer rails are installed in rack unit 37.

Procedure

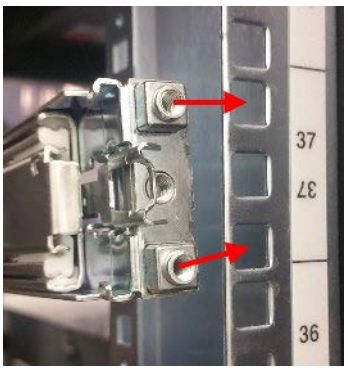
1. At the rear of the rack, with the inside of the outer rail facing into the rack, align the two square studs at the rear of the rail with the back of the top and bottom square holes for the applicable rack unit in the vertical mounting rail.



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.

Mount the server in the rack

Procedure

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.
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.

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.

Procedure

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.

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.

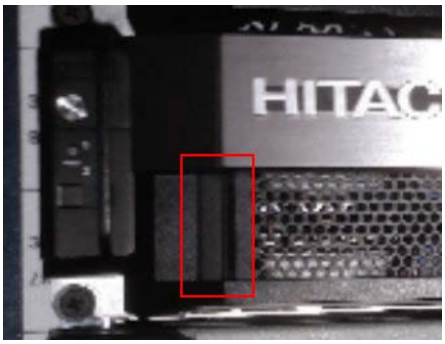
Procedure

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.

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 switches into, see Considerations for HCP racking and PDU connections (on page 31) .

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.

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 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.

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 HCP systems. A pair of ICX 6430-48 switches can connect up to 44 HCP systems. Each switch takes up one rack unit. The switches are mounted in rack positions U27 and U28.

Items you need to rack the Ethernet switches include:

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

Unpack the Brocade ICX 6430

Before you begin

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.

Supply the following items (per switch):

- Four racking screws
- Four Caged nuts

Procedure

1. Set the required items aside in an easy-to-reach location.
2. Leave the unused items in the switch container, and set the container aside.

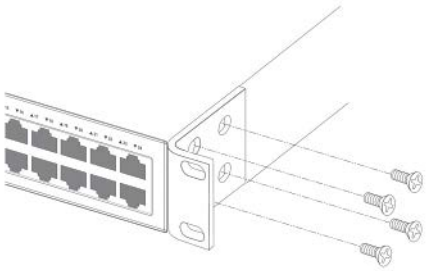
   The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

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

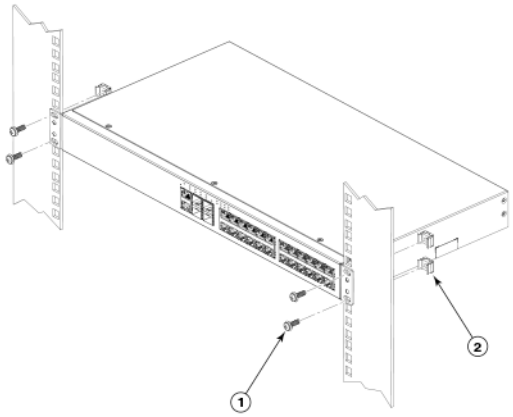
Mount the Brocade ICX 6430 in the rack

Procedure

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 U27.
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 U28.
5. Install two venting panels in the front of the rack in positions U27 and U28.
   a. Insert a single caged nut in the center square hole of the left and right side of the rack at positions U27 and U28.
   b. Use rack mounting screws to secure the perforated blanking panels to the front of the rack.

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 switches into, see Considerations for HCP racking and PDU connections (on page 31) .

HCP G11 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430 or HP 4208VL), 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 local 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. 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 U27 or the left half of the HP 4208VL switch in rack position U37. 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 U28 or the right half of the HP4208VL switch in rack position U37.

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 backend Ethernet networking run at 1G when connected to either the Brocade ICX 6430 or HP 4208VL switches.

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 either the Brocade ICX6430 or HP 4208VL switches.

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.

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 U27. The blue cable harnesses are devoted exclusively to the Brocade ICX 6430 switch in rack position U28.

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:

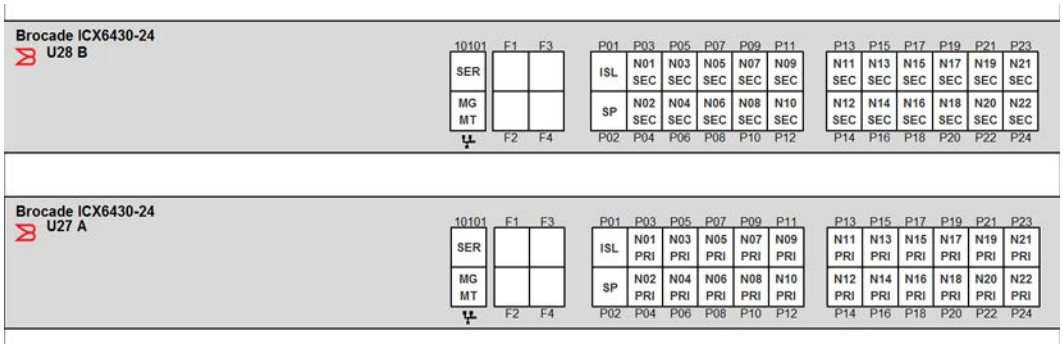
SER
: the serial port used to configure the switch.

MGMT
: the management port used to configure the switch.

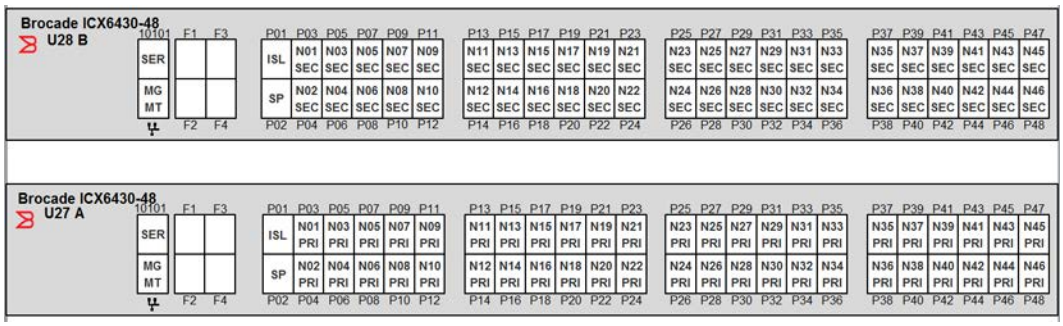
ISL
: the inter-switch link used to connect the two back-end switches to one another.

SP
: the service port used by Hitachi Vantara service personnel.

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.

Connect the Brocade ICX 6430 Ethernet cables

Procedure

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 U27 to port 1 on the switch in position U28.
2. Locate one red and one blue Ethernet cable harness.

   The first two CAT-6 cable harnesses are 7 feet in length. If there are additional sets of cable harnesses, they are 25 feet in length and are used for nodes 17 through 80.
3. Connect the short end of the red cable harness cables to the switch in rack position U37 on the proper left hand switch module.

   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 switch in rack position U37 on the proper right hand switch module.

   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 the HCP G11 Nodes 1 through 8 using the back-end network port marked PRI.

   Not all of the cables may be used if the number of nodes is less than eight.
7. Connect the long end of the blue cable harness cables to the HCP G11 Nodes 1 through 8 using the back-end network port marked SEC.

   Not all of the cables may be 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. Repeat steps 1 through 8, incrementing the node numbers as appropriate.
    - If there are more than eight nodes in the HCP system, increment the node numbers by eight.
    - If there are more than sixteen nodes in the HCP system, increment 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 HCP systems. Each switch takes up one rack unit. The switches are mounted in rack positions U27 and U28.

Items you will need to rack the Ethernet switches include:

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

Unpack the Brocade VDX 6740

Before you begin

Locate the following items in the switch container:

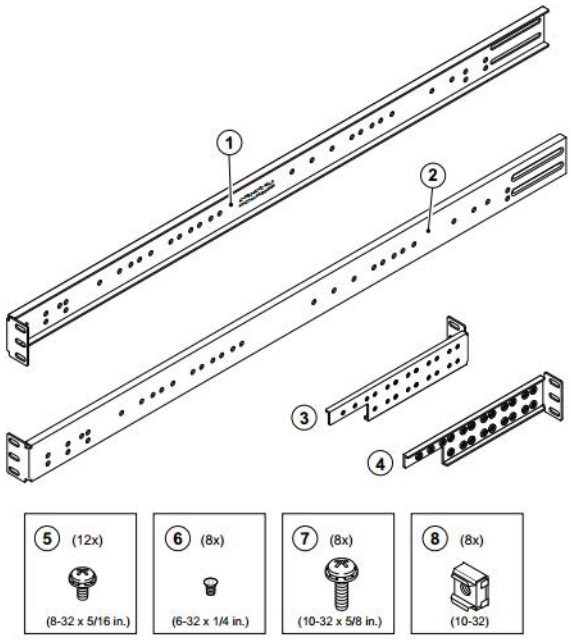
- Brocade VDX 6740 switch
- Serial cable for Brocade switches

Supply the following items (per switch):

- Eight M5 caged nuts
- Eight M5 screws

Procedure

1. Locate the four-post fixed rack mount kit (24 inch-32 inch), containing the items shown in the following figure.



1	Bracket; front right
2	Bracket; front left
3	Bracket; rear left
4	Bracket; rear right
5	Screw; 8-32 x 5/16-in, panhead Phillips
6	Screw; 6-32 x 1/4-in, flathead Phillips
7	Screw; 10-32 x 5/8-in, panhead Phillips
8	Retainer nut; 10-32

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

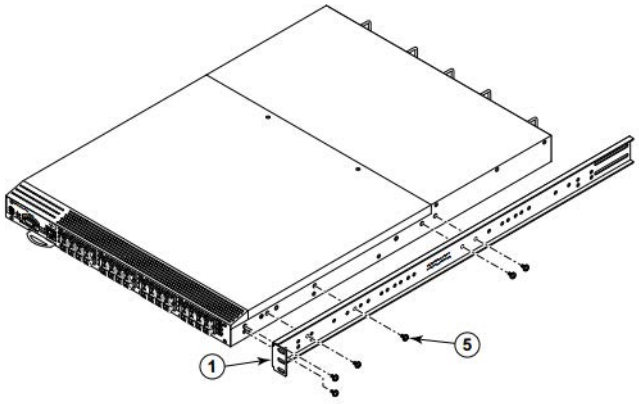
   The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

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

Install the Brocade VDX 6740 rails

Procedure

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).

Mount the Brocade VDX 6740 in the rack

Procedure

1. Set the M5 caged nuts in all three positions in U27 (switch A) and U28 (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 U27 and U28 on the left and right side of the rack.

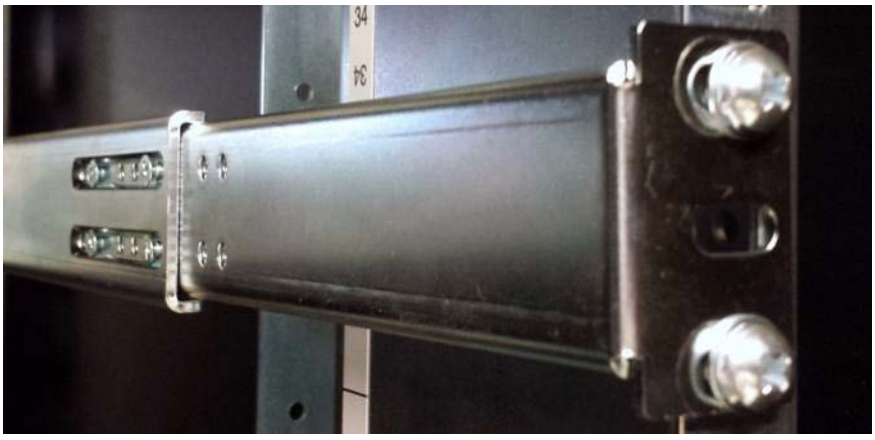
   Use the caged nuts from the rack accessory kit, not the ones from the Brocade rail kit.
3. Position the switch in the rear cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.
4. Attach the left and right rails of the switch into the rear of the rack by 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.

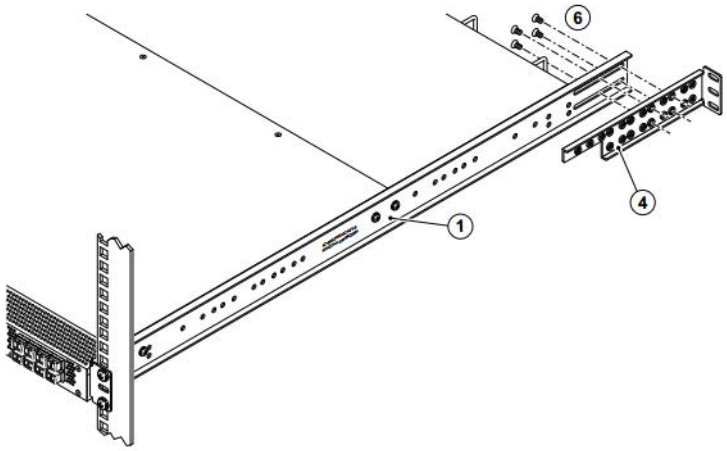
5. After the four rear screws have been secured, you should be able move to the front of the cabinet to secure the rear of the rails.

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.



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



1	Bracket; front right
4	Bracket; rear right
6	Screw; 6-32 x 1/4-in, flathead Phillips

7. Install two vented panels in the front of the rack in rack units U27 and U28.

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 switches into, see Considerations for HCP racking and PDU connections (on page 31) .

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.

HCP G11 Node 10G port diagrams

For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G11 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures in this section show all of the possible ways to configure Ethernet ports on a HCP G11 Node with local storage.

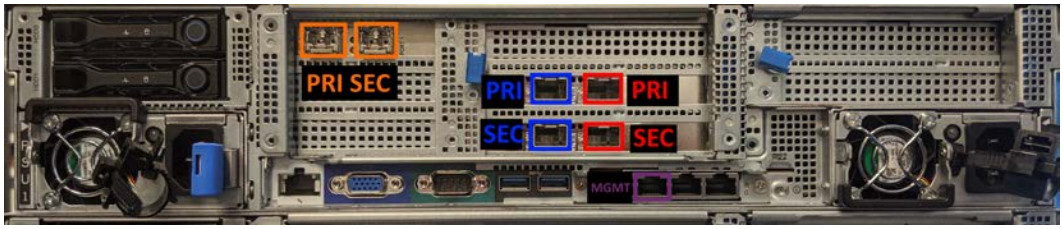
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the backend network connection. The port with the purple frame is the management port.

Note: The purple port should not be used unless you are configuring the system for a [hcp_management] network.

The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U27, or the Cisco Nexus 5548UP switch in rack position U27, or the Cisco Nexus 5596UP switch in rack position U37. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U28, or the Cisco Nexus 5548UP switch in rack position U28, or the Cisco Nexus 5596UP switch in rack position U39.

The following image shows an HCP G11 Node with 10G SFP+ ports for backend network connections.

The following image shows an HCP G11 Node with 10G SFP+ ports for both front-end and back-end connections.



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 G11 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.

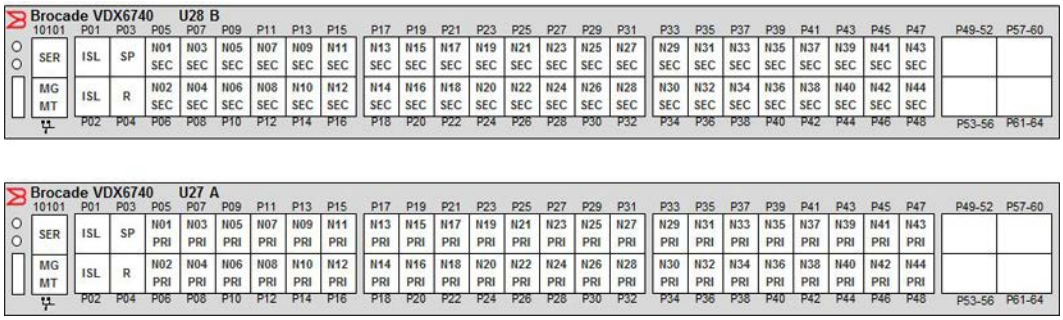
ISL
: the inter-switch link used to connect the two back-end switches to one another.

SP

the service port used by Hitachi Vantara service personnel.

R

the port is reserved.



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.

Connect the Brocade VDX 6740 Ethernet cables

Procedure

1. Connect the switches.
   a. Locate two one meter Twinax cables.
   b. Connect the first cable from port 1 on the switch in position U27 to port 1 on the switch in position U28.
   c. Connect the second cable from port 2 on the switch in position U27 to port 2 on the switch in position U28.
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 G11 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. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.
   b. Peel off the second of the pair and attach it to the other end of the Twinax cable.
5. Connect the switch to the PRI port.
   a. Connect one end of the Twinax cable to the switch in rack position U27 using the port for the node with the corresponding cable number.
   b. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.

6. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.
   b. Peel off the second of the pair and attach it to the other end of the Twinax cable.
7. Connect the switch to the SEC port.
   a. Connect one end of the Twinax cable to the switch in rack position U28 using the port for the node with the corresponding cable number.
   b. 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 5548UP

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: **32** **Note:** You can increase the number of ports to 48 by using one pair of 16 port expansion modules. Available HCP connections: **44**
5596UP	Ports per switch: **48** **Note:** You can increase the number of ports to 96 by using 3 pairs of 16 port expansion modules. Available HCP connections: **80**

Switch	Specifications
31108PC-V	Ports per switch: **48** Available HCP connections: **44**
31128PQ	Ports per switch: **96** Available HCP connections: **80**

Items you need to rack the Ethernet switches include:

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

Unpack the Cisco Nexus 5548

Before you begin

Locate the following items in the switch container:

- Cisco Nexus 5548 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

Supply the following items (per switch):

- Eight M5 screws
- Eight M5 caged nuts

Procedure

1. Locate a single 10G SFP+ to 1G RJ-45 adapter module, Cisco part number GLC-T=.P.
2. Set the required items aside in an easy-to-reach location.
3. 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.

Install port expansion modules in Cisco Nexus 5548 switch

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:

Procedure

1. Locate the boxes containing the sixteen port Universal Port Expansion modules.

2. Unscrew the dummy plate from the front of the Cisco Nexus 5548UP 10G Ethernet switch with a Philips screwdriver.
3. Release the dummy plate locking lever.

4. Carefully install the Port Expansion module.
   Align the module in the switch and lock the lever into place.
5. Screw the module in place using the screw attached to the lever.
   Do not over-tighten.

6. Repeat steps 1 through 5 for the sixteen port expansion module in the second Cisco Nexus 5548UP switch.

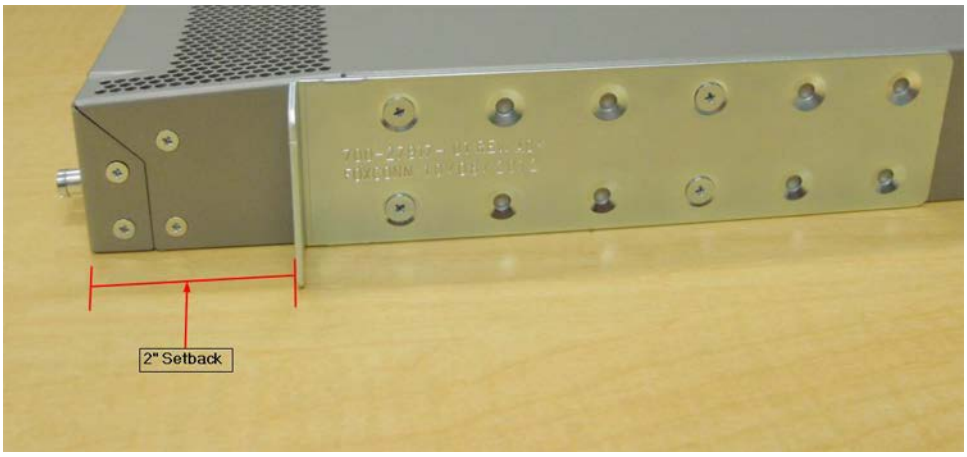
Install the Cisco Nexus 5548UP rails

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

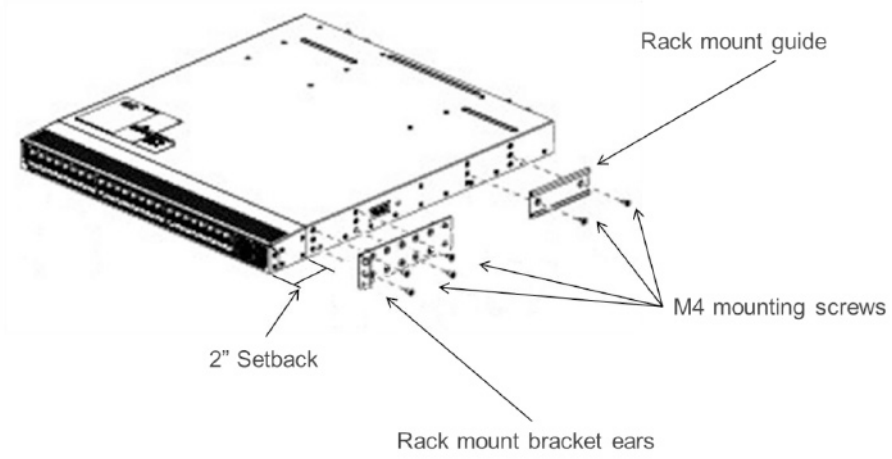
Procedure

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.

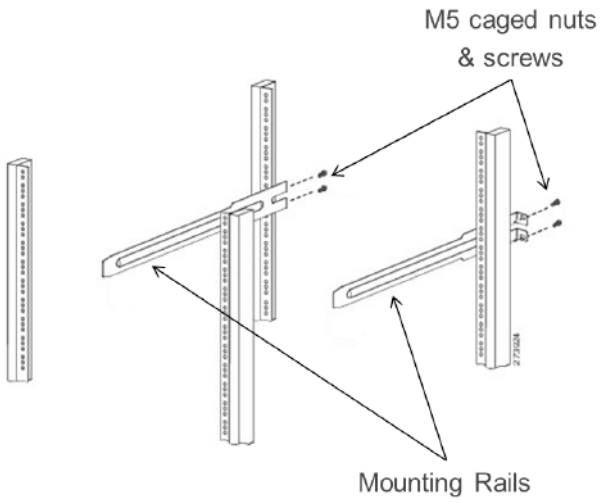


3. Install the rear mounting bracket to the rear of the switch with two M4 mounting screws as shown below.



4. Repeat steps 1 through 3 for the other side of the switch and the other Cisco Nexus 5548UP 10G Ethernet switch.

5. Install M5 caged nuts in the front of the rack in the bottom, middle, and upper square holes of rack positions U27 and U28 on both the left and right side of the rack.



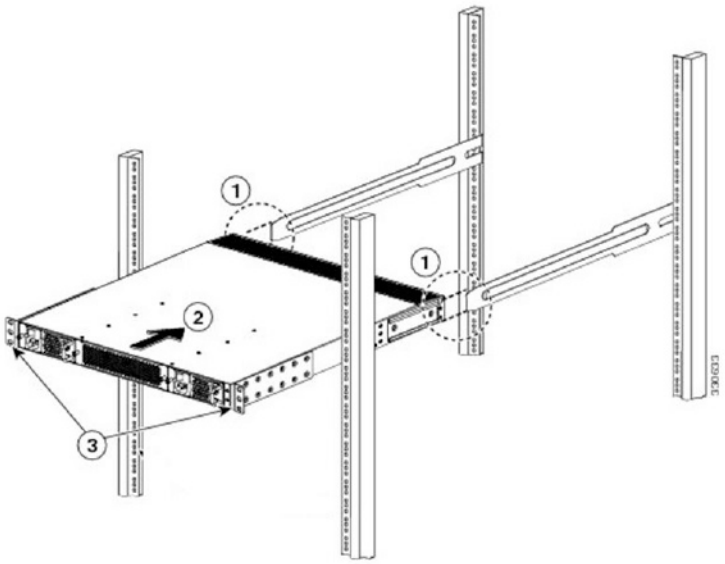
Important: Be sure to install the caged nuts on the front of the rack in the center positions of each rack unit that will be occupied by a switch prior to installing the switches. It is not possible to do so later in the process.

Mount the Cisco Nexus 5548 in the rack

Procedure

1. Install M5 caged nuts in the rear of the rack in the top and bottom square holes of rack positions U27 and U28 on both the left and right side of the rack.
2. Slide the first switch into place in U27, 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 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 U28.
5. Use two M5 screws with plastic washers to install two 1U perforated blanking panels in the front of rack units 27 and 28.

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 overtighten the screws to compensate.

Connect the Cisco Nexus 5548UP switches to the PDUs

Connect the power cables of the Cisco Nexus 5548UP switches to the PDUs.

For more information about which PDU outlets to plug the power cables of the switches into, see Considerations for HCP racking and PDU connections (on page 31) .

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.

HCP G11 Node 10G port diagrams

For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G11 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures in this section show all of the possible ways to configure Ethernet ports on a HCP G11 Node with local storage.

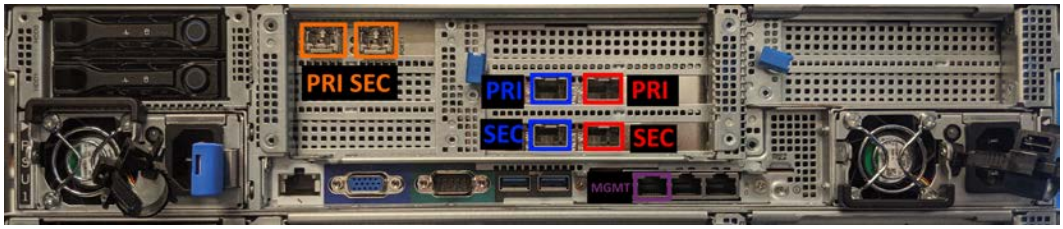
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the backend network connection. The port with the purple frame is the management port.

Note: The purple port should not be used unless you are configuring the system for a [hcp_management] network.

The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U27, or the Cisco Nexus 5548UP switch in rack position U27, or the Cisco Nexus 5596UP switch in rack position U37. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U28, or the Cisco Nexus 5548UP switch in rack position U28, or the Cisco Nexus 5596UP switch in rack position U39.

The following image shows an HCP G11 Node with 10G SFP+ ports for backend network connections.

The following image shows an HCP G11 Node with 10G SFP+ ports for both front-end and back-end connections.



Cisco Nexus 5548UP 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.

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:

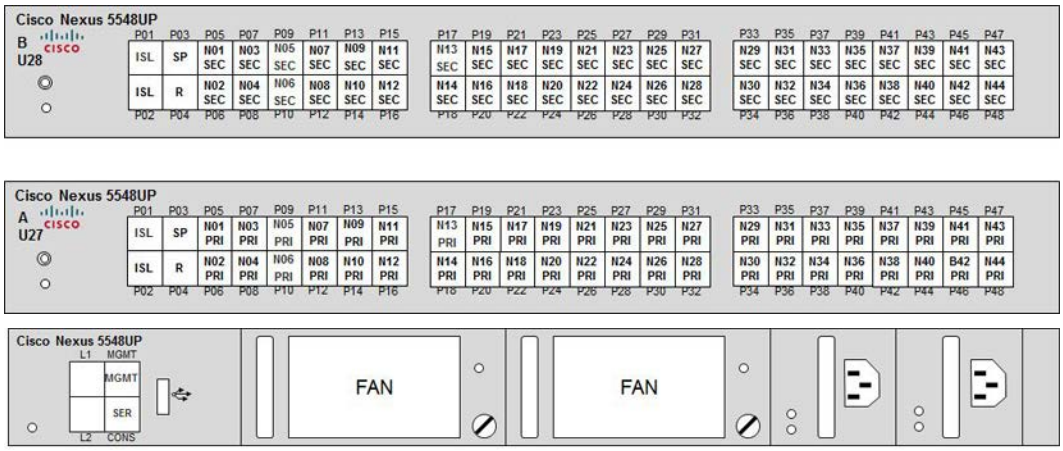
SER
: the serial port used to configure the switch.

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.



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.

Connect the Cisco Nexus 5548UP Ethernet cables

Procedure

1. Connect the switches.
   a. Locate two one meter Twinax cables.
   b. Connect the first cable from port 1 on the switch in position U27 to port 1 on the switch in position U28.
   c. Connect the second cable from port 2 on the switch in position U27 to port 2 on the switch in position U28.
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 G11 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. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.
   b. Peel off the second of the pair and attach it to the other end of the Twinax cable.
5. Connect the switch to the PRI port.
   a. Connect one end of the Twinax cable to the switch in rack position U27 using the port for the node with the corresponding cable number.
   b. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.
6. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.

b. Peel off the second of the pair and attach it to the other end of the Twinax cable.

7. Connect the switch to the SEC port.
   a. Connect one end of the Twinax cable to the switch in rack position U28 using the port for the node with the corresponding cable number.
   b. 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 HCP systems. Each switch takes up two rack units. The 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

Unpack the Cisco Nexus 5596UP

Before you begin

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

Supply the following items (per switch):

- Eight M5 screws
- Eight M5 caged nuts

Procedure

1. Locate a single 10G SFP+ to 1G RJ-45 adapter module, Cisco part number GLC-T=.P.
2. Set the required items aside in an easy-to-reach location.

3. 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.

Install port expansion modules in Cisco Nexus 5596UP switch

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:

Procedure

1. Locate the boxes containing the sixteen port Universal Port Expansion modules.

2. Unscrew the dummy plate from the front of the Cisco Nexus 5596UP 10G Ethernet switch with a Philips screwdriver.
3. Release the dummy plate locking lever.

   The image shows a Cisco Nexus 5548 switch for example purposes.

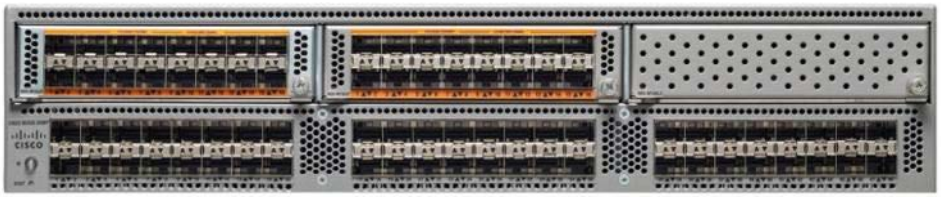
4. Carefully install the Port Expansion module by aligning the module in the switch and lock the lever into place.
5. Screw the module in place using the screw attached to the lever.

   Do not over-tighten. The image shows a Cisco Nexus 5548 switch for example purposes.

6. Repeat steps 1 through 5 for the sixteen port expansion module in the second Cisco Nexus 5596UP switch.

Example

The following figure shows a Cisco Nexus 5596UP switch with two expansion modules installed.



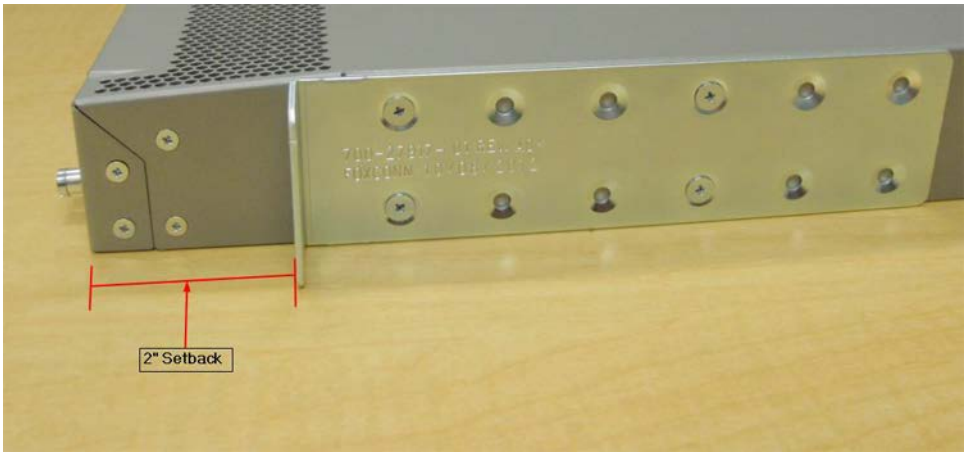
Install the Cisco Nexus 5596UP rails

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.

Procedure

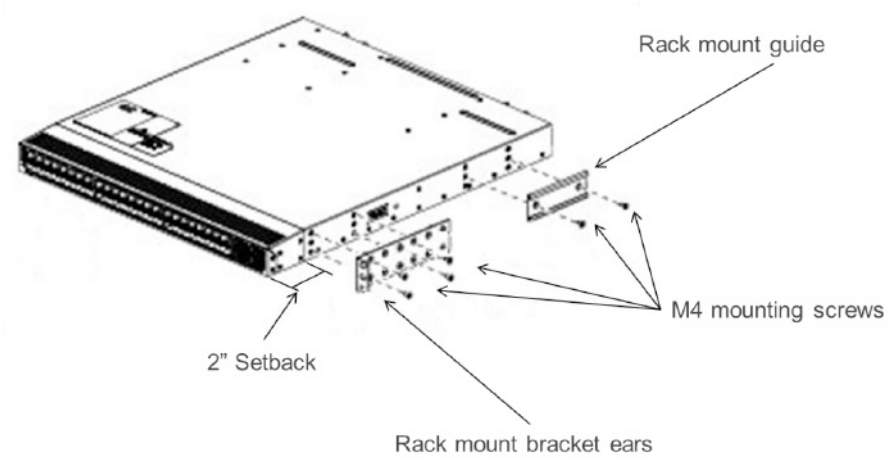
1. Orient the brackets with the mounting ears to the port side of the switch.
2. Attach the ears to the sides of the switch with four M4 screws per bracket so that the face of the switch is mounted with a 2 inch setback as shown in the image below.

   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.

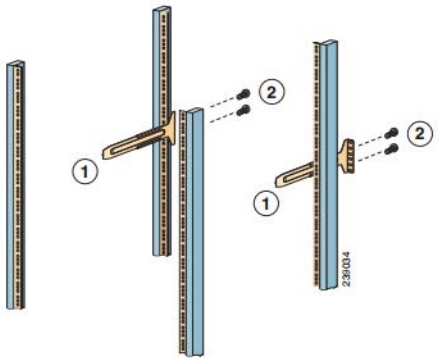


3. Install the rear mounting bracket to the rear of the switch with four M4 mounting screws as shown below.

   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.

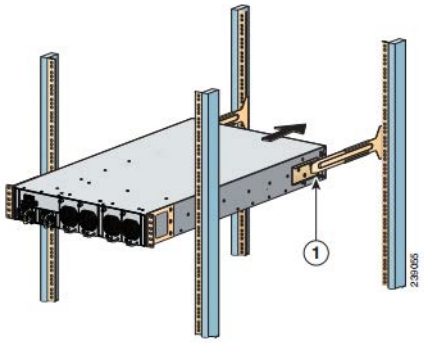
Mount the Cisco Nexus 5596UP in the rack

Procedure

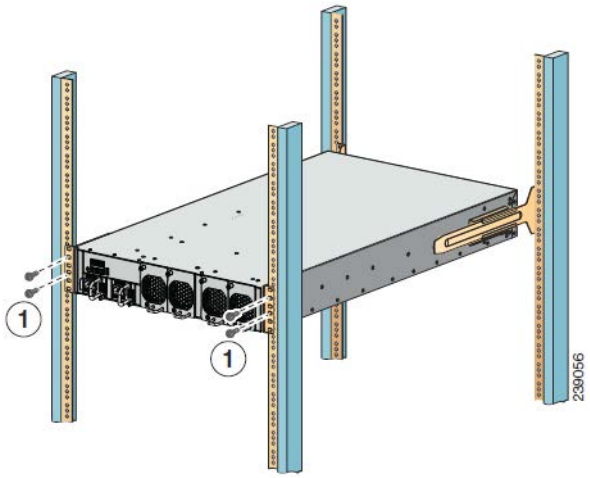
1. Install M5 caged nuts in the rear of the rack in the bottom square holes of rack positions U37 and U39 and the top square hole of rack positions U38 and U40 on both the left and right side of the rack.
2. Slide the first switch into place in U37, taking care to align the rear mounting bracket on the 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 following graphic shows the switch backwards, the principal is the same, and the general procedure should be followed.



4. After 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.

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 power cables of the switches into, see Considerations for HCP racking and PDU connections (on page 31).

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.

HCP G11 Node 10G port diagrams

For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G11 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures in this section show all of the possible ways to configure Ethernet ports on a HCP G11 Node with local storage.

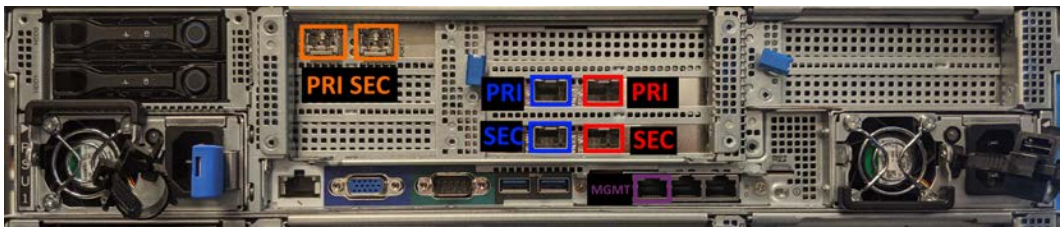
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the backend network connection. The port with the purple frame is the management port.

Note: The purple port should not be used unless you are configuring the system for a [hcp_management] network.

The blue PRI label denotes the primary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U27, or the Cisco Nexus 5548UP switch in rack position U27, or the Cisco Nexus 5596UP switch in rack position U37. The blue SEC label denotes the secondary port of the back-end network, which should be connected to the Brocade VDX 6740 switch in rack position U28, or the Cisco Nexus 5548UP switch in rack position U28, or the Cisco Nexus 5596UP switch in rack position U39.

The following image shows an HCP G11 Node with 10G SFP+ ports for backend network connections.

The following image shows an HCP G11 Node with 10G SFP+ ports for both front-end and back-end connections.



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.

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:

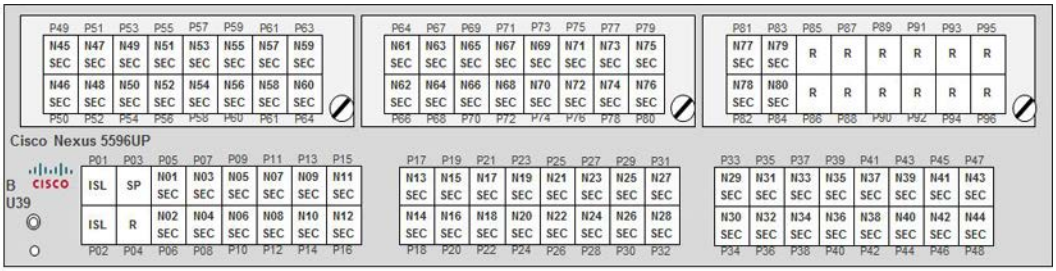
SER
: the serial port used to configure the switch.

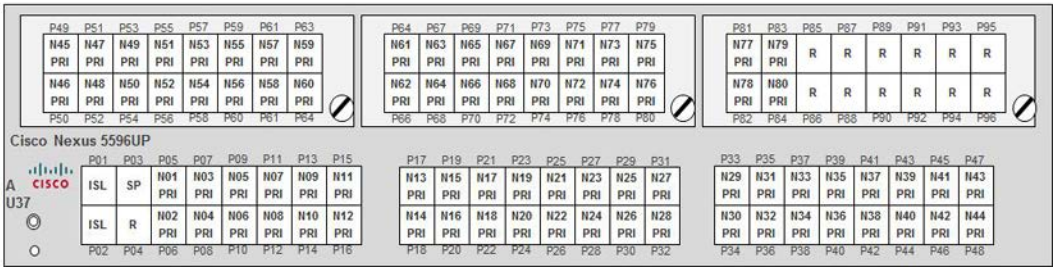
MGMT
: the management port used to configure the switch.

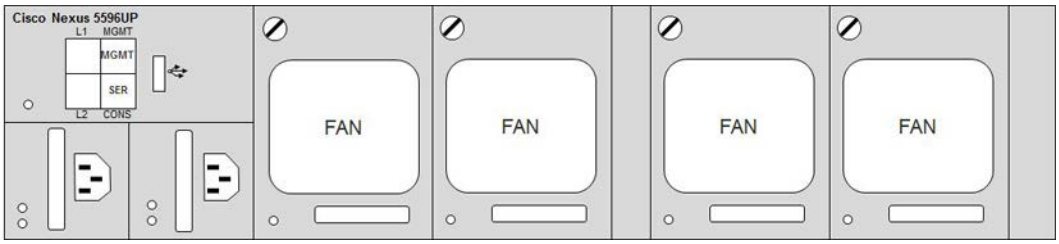
ISL
: the inter-switch link used to connect the two back-end switches to one another.

SP
: the service port used by Hitachi Vantara service personnel.

R
: the port is reserved.







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.

Connect the Cisco Nexus 5596UP Ethernet cables

Procedure

1. Connect the switches.
   a. Locate two one meter Twinax cables.
   b. Connect the first cable from port 1 on the switch in position U27 to port 1 on the switch in position U28.
   c. Connect the second cable from port 2 on the switch in position U27 to port 2 on the switch in position U28.
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 G11 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. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.
   b. Peel off the second of the pair and attach it to the other end of the Twinax cable.
5. Connect the switch to the PRI port.
   a. Connect one end of the Twinax cable to the switch in rack position U27 using the port for the node with the corresponding cable number.
   b. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.
6. Label both ends of each Twinax cable.
   a. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable.
   b. Peel off the second of the pair and attach it to the other end of the Twinax cable.
7. Connect the switch to the SEC port.

a. Connect one end of the Twinax cable to the switch in rack position U28 using the port for the node with the corresponding cable number.
b. 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.

(Optional) 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.

Procedure

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.

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.

Chapter 4: Connecting the HCP system at your site

A preassembled HCP RAIN 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.
- All the components are plugged into the PDUs.

For a system ordered without a rack, the instructions in Mounting unracked components (on page 30), 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 RAIN system includes four PDUs. Each PDU has a fixed power cable of the applicable type for the location for which the system was ordered.

A system that includes more than twelve nodes or that has a front-end connection uses all four PDUs.

Note: Depending on the components included in an HCP RAIN system that you assemble yourself, you may choose to have only two PDUs in the rack.

Each node in an HCP RAIN system is connected to two PDUs.

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.

After you've connected the PDUs to the power sources, you can power on the nodes. The switches power on automatically when the PDUs are connected to the power sources.

Connecting to your corporate network

An HCP RAIN 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 frontend network to your HCP G11 Nodes, see HCP G11 Node 1 GB port diagram (on page 68) or HCP G11 Node 10G port diagrams (on page 75) and connect your cables to the red ports in the appropriate node diagram.

Important: The default front-end IP addresses for the HCP nodes are 192.168.100.101, 192.168.100.102, and so forth. 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 *Reconfiguring the HCP system for your site*.

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

Chapter 5: Reconfiguring the HCP system for your site

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

- Verify that the serial number is correct in the system and, if it isn't, rectify it
- Change the HCP network settings to match your computing environment
- Change the HCP DNS setting to match your compurting environment.
- Change the time setting for the HCP system to match your computing environment.
- Make the back-end switches known to HCP.
- Obtain and install exclusive Support access credentials for SSH if SSH is used in your computing environment.

To perform these activities, you must use the HCP System Management Console. 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 HCPsystem 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 set up the HCP system at your site. Before performing these activities at any other time, consult your authorized HCP provider.

Preparing to reconfigure the system

To reconfigure an HCPsystem for your computing environment, you must create a user account that has the service role.

Tip: Do not create additional user accounts and roles until you are sure the HCP system is fully operational.

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

Connect to the HCP default back-end network

For using the HCP System Management Console, you need a client computer with connectivity to the default back-end subnet to which the HCP nodes belong. Following is a workflow for connecting a client computer to this subset:

Procedure

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.

Log in with the initial user account

Procedure

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

      the current session.
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:
   a. In the **Existing Password** field, type: Chang3Me!
   b. In the **New Password** field, type a new password for the security account.

      Passwords must be from six through 64 characters long. They are case sensitive, and contains 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.
   c. In the **Confirm New Password** field, type the new password again.

> **Tip:** 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.

Check the health of the HCP system

Following is a workflow to ensure that the HCP system is running properly.

Procedure

1. In the top-level menu of the HCP System Management Console, click **Hardware**.
2. On the **Hardware** page, for each node, check that:
   a. The node status is `Available`
   b. The status of each logical volume is `Available`

   > **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`, 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.

Create a service account

Following is a workflow to create a user account to reconfigure the HCP system, in the HCP System Management Console:

Procedure

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:
   a. In the **Username** field, type a username for the user account.

      Usernames must be from one through 64 characters long and may contain any valid UTF-8 characters. It cannot start with an opening square bracket ([). White space is allowed.
   b. In the **Full Name** field, type a full name for the user account.

      This name must be from one through 64 characters long and may contain any valid UTF-8 characters, including white space.

c. In the **Password** field, type a password for the user account.

   Passwords must be from six through 64 characters long. They are case sensitive, and contains 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.

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

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

e. In the **Roles** section, select **Service**.

4. Click the **Create Account** button.
5. In the upper right corner of the console, click **Log Out**.
   The console returns to the login page.

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

Following is a workflow designated to verify, and if necessary, change sthe serial number in the HCP system configuration.

Before you begin

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.

Procedure

1. Select **Configuration** > **Miscellaneous** from the top-level menu of the System Management Console.
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 **Update Settings**.

Changing the network settings

The HCP system is installed with default network settings. You need to change these settings to match your computing environment.

Before you begin

Following is the workflow you need to know before you begin:

- 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 must 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 HCP 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
  ```

- 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

Procedure

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:
   - Type the new IP address, in the **Gateway** field, to change the gateway IP address.
   - Type the new subnet mask, to change the subnet mask, in the **Netmask** field.
   - Select the **Make tagged network** option to make the front-end network tagged. 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.
   - Click the **Downstream DNS Configuration** to change the DNS settings for the network. Following is the workflow for this process.
     - To enable or disable hidden master, select or deselect, respectively, the **Enable hidden master** option.
     - 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 the network settings" (on page 103) .
   - To change the node IP addresses, in the **Node IP Addresses** section, type new front-end IP addresses for the nodes in the HCPsystem.

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

4. Click **Update Settings**.
   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 **Update Settings**.
   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 configuration activity.

Changing the back-end network settings

Procedure

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.

Changing the back-end IP addresses

Procedure

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.

Procedure

1. In the top-level menu of the System Management Console, select **Configuration** > **DNS**.
2. On the **DNS Settings** page:
   - 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.

   a. Optionally, in the **Hostname Prefix** field, type a new hostname prefix.

   The hostname prefix can be from one through 12 characters long and contain only lowercase letters, numbers, and hyphens (-).

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

   b. 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 have made.
4. In the message window field, type yes. this is case sensitive.
5. Click the **Update Settings** button.
   The System Management 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

If you choose to use external time servers, you need to know the IP addresses or hostnames of these servers.

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. It 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 time-settings for the HCP system:

Procedure

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 apperas asking you to confirm the changes you have 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.

Procedure

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 appaers in the **Components** list. If you inadvertantly 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 **Update Settings**.

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.

Note: If SSH is used at the customer site, all SSH keys for a node are updated when Java Virtual Machine starts on the node. The same is true when nodes are swapped.

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.

Uploading exclusive Support access credentials

Obtain the SSH support credentials from the HCP distributor or Hitachi Vantara support.

Procedure

1. On the **Security** menu, select **Support Access Credentials**
2. Click **Upload Support Access Credentials**, and then click the **Choose File** button.
3. In the dialog box, go to the location where the exclusive Hitachi Vantara Support Access Credentials key package file is located, and double-click the file.
4. Click the **Next** button. The new SSH keys are uploaded from the key package, validated, and then a review screen asks you to confirm the package to install. (If the package cannot be validated, a message appears and you can try again with a different file.)

5. Review the information on the page.
   - If the information is correct, click **Next**. The procedure validates the package you selected and applies the new set of SSH keys to the system.
   - If the information is incorrect, click **Cancel**. The procedure is cancelled.
6. Verify that the system event is generated in **Monitoring > System Events** to confirm that the key package was applied successfully.

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.

Chapter 6: Configuring HCP monitoring with Hitachi Remote Ops

Hitachi Remote Ops is a Hitachi Vantara LLC product that enables remote monitoring of the nodes in an HCP 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 Remote Ops 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 Opsservers. 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 Opsservers that support IPv6 networks, see the applicable Hitachi Remote Opsdocumentation.

This chapter explains how to set up monitoring of HCP nodes with Hitachi Remote Ops .

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 Opsis 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 HCPsystem 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 HCPcustomer support.

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

Procedure

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:
   a. Select the **Enable SNMP** at `snmp.hcp-domain-name` option.
   b. Select either **Use version 1 or 2c** (recommended) or **Use version 3**.
   c. If you select **Use version 3**, specify a username and password in the **Username**, **Password**, and **Confirm Password** fields.
   d. 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

Procedure

1. Log in to Hitachi Remote Ops.
2. Set the Hitachi Remote Ops base configuration. Include the email addresses where error conditions (if they occur) will be sent.
3. (Optional) Configure transport agents gor reporting error conditons toHitachi Vantara support personnel.
4. Identify the HCP system to be monitored.

Step 1: Log in to Hitachi Remote Ops

To log in to Hitachi Remote Ops:

Procedure

1. Open a web browser window.

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

   ```
   http://hitrack.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 **Logon**.

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 services. 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 Opsis 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:

Procedure

1. In the row of tabs at the top of the Hitachi Remote Ops interface, click **Configuration**.
   a. 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. (Optional) In the **Device Monitoring** section:
   a. Type your Hitachi Vantara customer ID, in the Site ID field.
   b. 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:
   a. 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.
   b. 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.

c. In the **User List** field, type a comma-separated list of the email addresses to which Hitachi Remote Ops must send email about error conditions.
d. 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 recognized by the server.

4. Click the **Submit** button.
5. Click the **Test Email** button to send a test email to the specified email addresses. This is an optional step.

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 Opstries them in the order in which they are listed until one is successful.

To configure a transport agent:

Note: This is a conditional task.

Procedure

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 transfer agent.
3. Click the **Create** button. The new transport agent appears in tne 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 Opsdocumentation.
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 trasport agent to the top of the list:
   a. In the **Move to Top?** column, select the transport agent you want to move.
   b. Click the **Submit** button.

Step 4: Identify the HCP system

To identify the HCP system to be monitored:

Procedure

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 the check boxes below the table names at the top of the page to select or deselect the tables, as applicable. Then click **Refresh**.

   While no tables are shown, the page contains an **Add a Device** link.
2. Take one of the following 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 #unique_143.
11. In the **Comms Error Reporting** field, select one of these options to specify whether Hitachi Remote Ops must report communications 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 **Add**.

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

Chapter 7: 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.

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. You can use either secondary zones (also called slave zones) or stub zones.

Following is the workflow for this chapter:

- A discussion on the advantages of using DNS
- A description of zones, secondary zones, and stub zones
- The 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.

Note: 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. 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 relication 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 targeting 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,*hcpma.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 hcpca.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 HCPdomain 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 themall 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 HCPdomain, 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

Procedure

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

Configuring an HCP stub zone in Windows

How to configure an HCP domain as a stub zone in Windows:

Procedure

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. To configure the stub zone with Winodws Active Directory integration, take one of these following actions:
   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.
   c. 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*.

   d. To configure the stub zone without Windows Active Directory intregration, 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 a 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, 1192.168.210.12,
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 must 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 must 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

  Foe examples, you may 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 must 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.
- 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 must 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 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
```

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