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Hitachi Content Platform

Installing an HCP SAIN System On-Site Final Setup

Hitachi Data Systems

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Preface

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

Intended audience

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

Product version

This book applies to release 7.2 of the Hitachi Content Platform.

Related documents

The following documents contain additional information about Hitachi Content Platform:

- *Administering HCP* - This book explains how to use an HCP system to monitor and manage a digital object repository. It discusses the capabilities of the system, as well as its hardware and software components. The book presents both the concepts and instructions you need to configure the system, including creating the tenants that administer access to the repository. It also covers the processes that maintain the integrity and security of the repository contents.

- *Managing a Tenant and Its Namespaces* - This book contains complete information for managing the HCP tenants and namespaces created in an HCP system. It provides instructions for creating namespaces, setting up user accounts, configuring the protocols that allow access to namespaces, managing search and indexing, and downloading installation files for HCP Data Migrator. It also explains how to work with retention classes and the privileged delete functionality.

- *Managing the Default Tenant and Namespace* - This book contains complete information for managing the default tenant and namespace in an HCP system. It provides instructions for changing tenant and namespace settings, configuring the protocols that allow access to the namespace, managing search and indexing, and downloading installation files for HCP Data Migrator. It also explains how to work with retention classes and the privileged delete functionality.

- *Replicating Tenants and Namespaces* - This book covers all aspects of tenant and namespace replication. Replication is the process of keeping selected tenants and namespaces in two or more HCP systems in sync with each other to ensure data availability and enable disaster recovery. The book describes how replication works, contains instructions for working with replication links, and explains how to manage and monitor the replication process.

- *HCP Management API Reference* - This book contains the information you need to use the HCP management API. This RESTful HTTP API enables you to create and manage tenants and namespaces programmatically. The book explains how to use the API to access an HCP system, specify resources, and update and retrieve resource properties.

- *Using a Namespace* - This book describes the properties of objects in HCP namespaces. It provides instructions for accessing namespaces by using the HTTP, WebDAV, CIFS, and NFS protocols for the purpose of storing, retrieving, and deleting objects, as well as changing object metadata such as retention and shred settings. It also explains how to manage namespace content and view namespace information in the Namespace Browser.

- *Using the HCP HS3 API* - This book contains the information you need to use the HCP HS3 API. This S3™-compatible, RESTful, HTTP-based API enables you to work with buckets and objects in HCP. The book introduces the HCP concepts you need to understand in order to use

HS3 effectively and contains instructions and examples for each of the bucket and object operations you can perform with HS3.

- *Using the HCP OpenStack Swift API* - This book contains the information you need to use the HCP HSwift API. This OpenStack Swift, RESTful, HTTP-based API enables you to work with containers and objects in HCP. The book introduces the HCP concepts you need to understand in order to use HSwift effectively and contains instructions and examples for each of the container and object operations you can perform with HSwift.

- *Using the Default Namespace* - This book describes the file system HCP uses to present the contents of the default namespace. It provides instructions for accessing the namespace by using the HCP-supported protocols for the purpose of storing, retrieving, and deleting objects, as well as changing object metadata such as retention and shred settings.

- *HCP Metadata Query API Reference* - This book describes the HCP metadata query API. This RESTful HTTP API enables you to query namespaces for objects that satisfy criteria you specify. The book explains how to construct and perform queries and describes query results. It also contains several examples, which you can use as models for your own queries.

- *Searching Namespaces* - This book describes the HCP Search Console (also called the Metadata Query Engine Console). It explains how to use the Console to search namespaces for objects that satisfy criteria you specify. It also explains how to manage and manipulate queries and search results. The book contains many examples, which you can use as models for your own searches.

- *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 or move 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* - 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.

- *Third-Party Licenses and Copyrights* - This book contains copyright and license information for third-party software distributed with or embedded in HCP.

- *HCP-DM Third-Party Licenses and Copyrights* - This book contains copyright and license information for third-party software distributed with or embedded in HCP Data Migrator.

- *Installing an HCP RAIN System - Final On-site Setup* - This book contains instructions for deploying an assembled and configured HCP RAIN system at a customer site. It explains how to make the necessary physical connections and reconfigure the system for the customer computing environment. The book also provides instructions for assembling the components of an HCP RAIN system that was ordered without a rack and for configuring Hi-Track Monitor to monitor the nodes in an HCP system.

Accessing product documentation

Product documentation is available on Hitachi Data Systems Support Connect: https://support.hds.com/en_us/documents.html. Check this site for the most current documentation, including important updates that may have been made after the release of the product.

Getting help

Hitachi Data Systems Support Portal is the destination for technical support for your current or previously sold storage systems, midrange and enterprise servers, and combined solution offerings. The Hitachi Data Systems® customer support staff is available 24 hours a day, seven days a week. If you need technical support, log into the Hitachi Data Systems Support Portal for contact information: http://portal.hds.com

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Note: If you purchased G10 Node from a third party, please contact your authorized service provider.

Comments

Please send us your comments on this document:

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Include the document title and number, including the revision (for example, -01), and refer to specific sections and paragraphs whenever possible. All comments become the property of Hitachi Data Systems.

Thank you!

1

HCP SAIN system overview

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

An SAIN system, also referred to for this current generation of hardware as an HCP G10 with Attached Storage, is delivered to a customer site as either a racked appliance or unracked components. In either case, all the components are preconfigured, and the HCP software is already installed. However, once the system is delivered and, for unracked components, assembled, it needs some final on-site setup.

This chapter contains:

- An introduction to HCP
- A description of the hardware architecture of HCP SAIN systems
- An overview of the final setup activities required to make your G10 with Attached 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 object-based data storage environment. An HCP repository stores all types of data, from simple text files to medical images to multigigabyte database images.

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

HCP nodes

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

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

RAIN and SAIN systems

HDS offers three HCP products: HCP G10 with Local Storage, HCP G10 with Attached Storage, and HCP-VM:

- HCP G10 with Local Storage systems run on a redundant array of independent nodes (RAIN) and use storage that's internal to those nodes.
- HCP G10 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 model-name-3 system can have internal storage in addition to being connected to SAN storage.
- HCP-VM systems run on virtual machines in a VMware® environment.

HCP SAIN systems support larger repositories than HCP RAIN systems.

HCP System Management Console

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

HCP SAIN system hardware

HCP SAIN system hardware consists of:

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

  The nodes in an HCP SAIN system are Quanta D51B-2U servers.

- HCP S Series Nodes. The possible node models are:

  - S10

  - S30

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

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

- Ethernet switches and cables for networking. The switches in an HCP G10 with Attached Storage can be for one or ten gigabyte back-end network configurations. The possible switch models are:

  - Supported one gigabyte switches:

    - Brocade ICX 6430

    - HP ProCurve 4208VL

  - Supported ten gigabyte switches:

    - Brocade VDX 6740

    - Cisco Nexus 5548UP

    - Cisco Nexus 5596UP

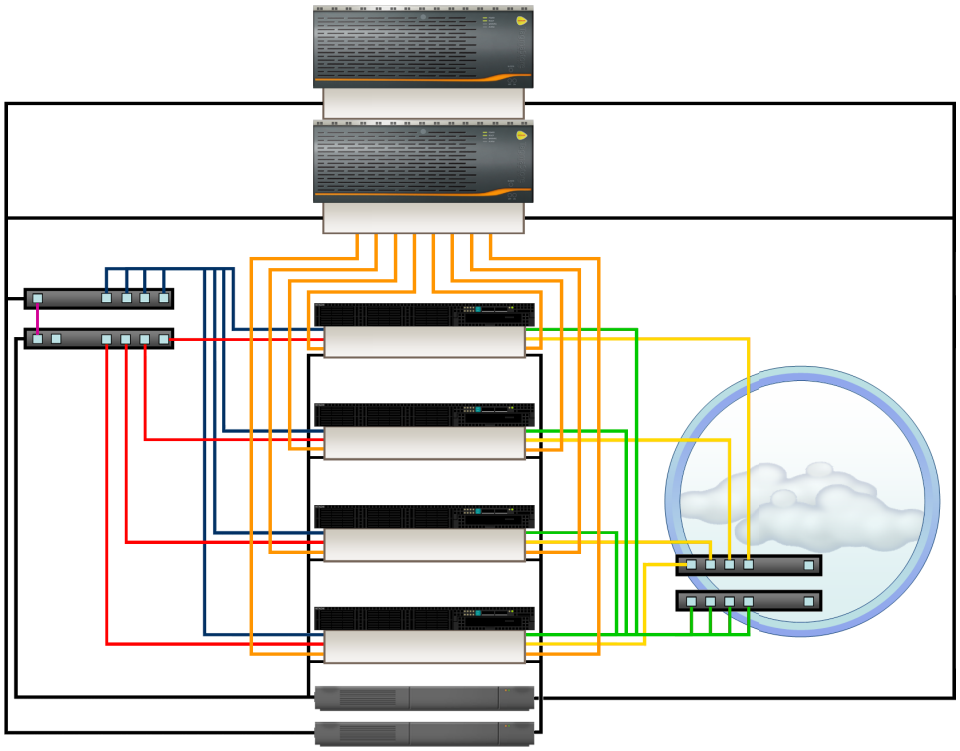
- Fibre Channel cables that connect the nodes to the storage arrays (Some systems use Fibre Channel switches to connect nodes and the storage arrays). The possible Fibre Channel switch models are:
  - Brocade 6510
  - Cisco MDS 9148S
- Additional infrastructure items such as a rack and power distribution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

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

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

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

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



The table below describes the cables in this figure.

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

Final on-site setup activities

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

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

Step	Activity	More information
1	Verify that your site is ready for the HCP system to be installed.	Chapter 2: "Site preparation" on page 7
2	For a preassembled system, remove the racked HCP system from the packing crate and position it in your data center.	N/A
	For a rackless system, assemble the HCP system components in a rack that you supply.	Chapter 3: "Assembling rackless components" on page 23
3	Connect the HCP PDUs to your power sources.	"Connecting to the power sources" on page 125
4	Reconfigure the HCP system for your environment.	Chapter 5: "Reconfiguring the HCP system for your site" on page 129
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.	"Connecting to your corporate network" on page 126
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.	*Administering HCP*
7	Optionally, configure Hi-Track Monitor to monitor the HCP nodes.	Chapter 6: "Configuring HCP monitoring with Hi-Track Monitor" on page 143

2

Site preparation

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

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

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

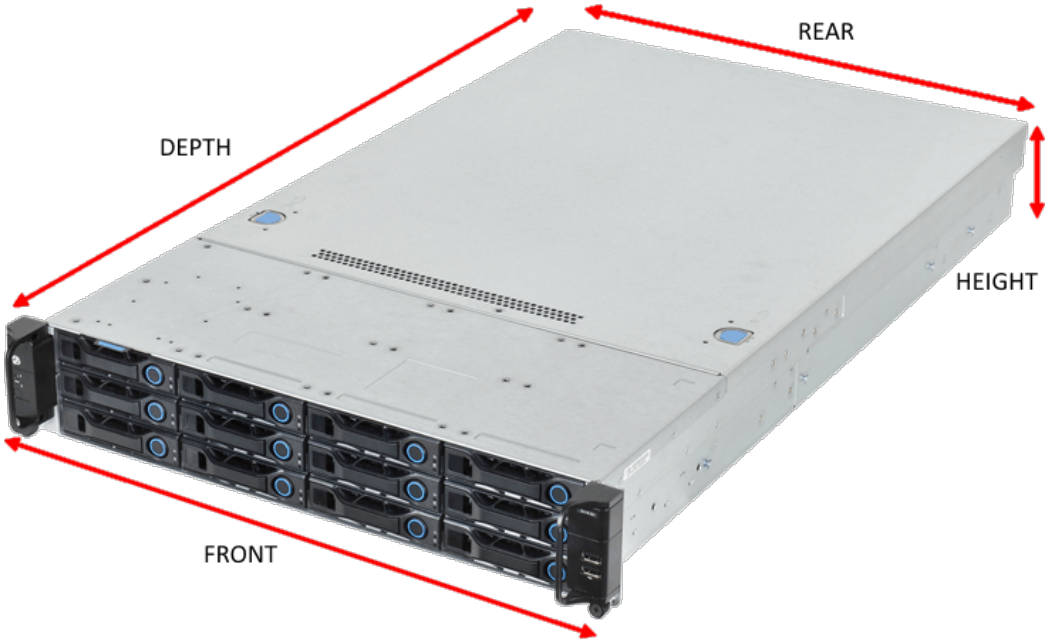
Mechanical Requirements

The following sections describe the mechanical specifications and requirements for an HCP G10 Node.

Dimensions

The table below shows the physical dimensions of the HCP G10 Node.

The labels in the figure below identify the faces of the HCP G10 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 an HCP G10 Node and HCP G10 system.

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
Servers			
HCP G10 Node attached 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, six 4TB HDDs, six empty drive carriers, rear drive cage, 1Gb dual-port Ethernet OCP card, RAID mezzanine card, and 10Gb dual-port Ethernet PCIe card, 8Gb dual-port Fibre Channel card, and two power cables.		54.76 (24.89)	54.76 (24.89)
16GB DIMM	2	0.15 (0.0675)	0.3 (0.135)
400GB or 800GB 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)
Ethernet Switches			
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)

(Continued)

Item	Quantity	Unit weight lbs. (kg)	Extended weight lbs. (kg)
Cisco Nexus 5596 (10Gb large)	2	47.41 (21.55)	94.82 (43.1)
Fibre Channel Switches			
Brocade 6510	2	20.15 (9.16)	40.3 (18.32)
Cisco MDS 9148S	2	19.8 (9)	39.6 (18)
Cables			
Two meter AC power cable — two required for each switch except the Brocade ICX 6430 which requires one	2	0.5 (0.227)	1.0 (0.454)
Seven foot 1Gb Ethernet cable harness	2	3.08 (1.4)	6.16 (2.8)
Twenty-five foot 1Gb Ethernet cable harness	2	11 (5)	22 (10)
Three meter 10Gb Ethernet cable (Twinax)	2	0.1 (0.22)	0.2 (0.44)
Five meter 10Gb Ethernet cable (Twinax)	2	0.18 (0.4)	0.36 (0.8)
Ten meter 10Gb Ethernet cable (Twinax)	2	0.36 (0.79)	0.72 (1.58)
Three meter 8Gb Fibre Channel cable	2	0.022 (0.05)	0.044 (0.1)
Rack & PDU			
HDS solution rack — includes two side panels, rear door, and accessory kit	1	225 (102.3)	225 (102.3)
Zero U 208/230V 30/32A PDU used with HCP	4	11 (5)	44 (20)
One U 208/230V 30/32A PDU used if S10 is included in the same rack as HCP	2	9.9 (4.5)	19.8 (9)

HDS solution rack

The table below shows the physical dimensions of the HDS solution rack used when the HCP G10 Node is purchased with rack.

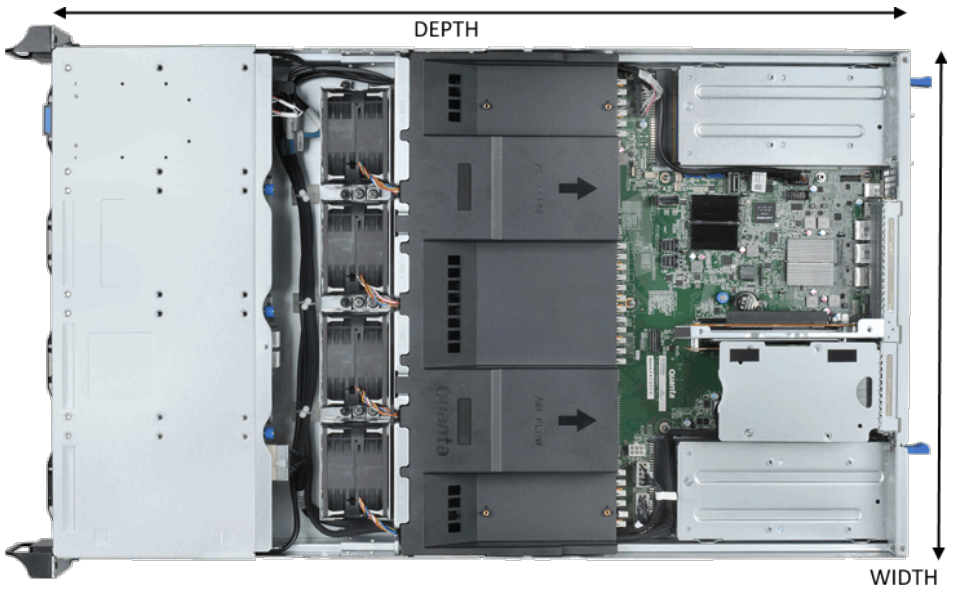
Parameter	Inches	mm
Width	23.6	600
Depth	47.2	1200
Height	79.1	2008

The weight of the empty rack, including the accessory kit, is 225.06 pounds (102.3 kg).

Customer supplied rack

You can purchase HCP G10 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.

  - Please refer to the following table for the appropriate outlets required for each HCP system component.

Component	# of U	# of Outlets	Outlet Type
HCP G10 Node	2	2	C13
Brocade ICX 6430 1Gb Ethernet	1	1	C13
HP 4208VL 1Gb Ethernet	5	2	C13

(Continued)

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
Brocade 6510 16Gb Fibre Channel	1	2	C13
Cisco MDS 9148S 16Gb Fibre Channel	1	2	C13

- For power requirements of each device, please see "Electrical requirements" on page 16.
- For storage components, including HCP S10, HCP S30, or Hitachi storage arrays, please see the appropriate documentation for those devices to determine the appropriate rack space, outlet quantity, outlet type, and power capacity requirements.
- Velcro straps and/or cable ties for bundling and securing cables.
- Screws and cage nuts for installing equipment into the rack(s).

Electrical requirements

The following sections describe the power requirements and electrical specifications for an HCP G10 Node and other required HCP system components.

Power system

For redundancy, an HCP G10 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.

In the Americas, the power system can be either single-phase or three-phase input with single phase on the outlets. In either case, the voltage must be 208V and the amperage per PDU must be 30A.

In EMEA and APAC, the power system also can be either single-phase or three-phase input with single phase on the outlets. For single-phase systems, the voltage must be 230V and the amperage per PDU must be 32A. For three-phase systems, the voltage must be 400V and the amperage per PDU must be 16A.

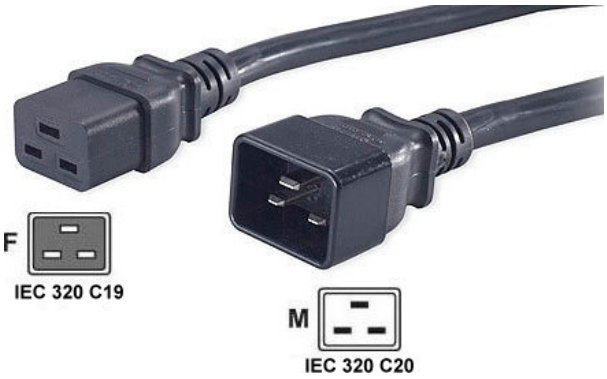
Power connections

The power connections required for the PDUs used with an HCP G10 Node differ by geography:

- In the Americas, HDS offers single-phase, 208V, 30A PDUs that have a NEMA L6-30P three-wire plug, as shown below.

- In EMEA and APAC, HDS offers single-phase, 230V, 32A PDUs that have an IEC 60309 three-wire plug, as shown below.

Optional S10 nodes in the same rack as HCP use two PDUs with IEC 320 C19 power outlets. 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.



Multiple PDUs with IEC 320 C13 outlets are provided with each HCP system. Each HCP G10 Node has two power supplies with IEC 320 C14 power inlet connectors. Each power supply connects to a PDU using a two meter IEC 320 C13 to IEC 320 C14 power cable, as shown below. Optional Fibre Channel switches and Ethernet switches use two meter IEC 320 C13 to IEC 320 C14 power cables. External storage array options require appropriate power connections using two meter IEC 320 C13 to IEC 320 C14 power cables.

Electrical specifications

In an HCP system, all of the electrical components are designed to be redundant with respect to failures. For each device in the system, there are either two power supplies or there are two of the devices present in the

system so there is no single point of failure if a power supply or PDU ceases to operate properly. In addition, since all components are redundant, a customer may connect the PDUs on the left side of the rack to one power system and the PDUs on the right side of the rack to a second power system, 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. However, if one power supply is unavailable, the device can run on the one available power supply.

Input voltage to the HCP system components at the outlets on the PDU should be single phase between 200V and 240V alternating current. Input frequency of the power supplied should be between 50 and 60 Hertz. The table below outlines the electrical specifications for the various components in an HCP system.

Component	Nominal amperage @ 208V (A)	Nominal wattage @ 208V (W)
HCP G10 Node	1.26	262
Brocade ICX 6430	0.20	41.6
HP 4208VL	1.68	349
Brocade VDX 6740	0.86	179
Cisco Nexus 5548	1.88	391
Cisco Nexus 5596	2.14	445
Brocade 6510	0.39	81.1
Cisco MDS 9148S	0.88	183

Electrical requirements

The following sections describe the power requirements and electrical specifications for an HCP G10 Node and other required HCP system components.

RoHS compliance

An HCP G10 Node, including all of 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 G10 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%

(Continued)

Component	* Operating temperature	Operating humidity (non-condensing)	Altitude	Non-operating temperature	Non-operating humidity (non-condensing)
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%
Brocade 6510	0°C to 40°C (32°F to 104°F)	10%-90%-	-60-3000m (-197-10,000 feet)	-25°C to 70°C (-13°F to 158°F)	10%-95%
Cisco MDS 9148S	0°C to 40°C (32°F to 104°F)	10%-90%-	0-3000m (0-10,000 feet)	-40°C to 70°C (-40°F to 158°F)	10%-95%

*The maximum operating temperature value is specified at sea level and is derated 2.0% per 1,000 feet of increased altitude.

Shock and vibration

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

Component	Operating shock	Non-operating shock	Operating vibration	Non-operating vibration
HCP system (not including storage components)	20G, 6ms, half-sine	33G, 11ms, half-sine, 3/eg axis	0.2Grms on z axis, 2 minutes	1.87Grms on 3 axes, 30 minutes

(Continued)

Component	Operating shock	Non-operating shock	Operating vibration	Non-operating vibration
HCP G10 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
Brocade 6510	20G, 6ms, half-sine	33G, 11ms, half-sine, 3/eg axis	0.5G sine, 0.5Grms random, 5 to 500Hz	2.0G sine, 1.1Grms random, 5 to 500Hz
Cisco MDS 9148S	N/A	N/A	N/A	N/A

Cooling and airflow

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

The following table shows the heat dissipation for each of the components, allowing a customer to calculate the heat load and required cooling for their

HCP system based on the components installed. It also includes the acoustic noise level of the fans in the units which are providing the airflow, where this information is available.

Component	Heat Dissipation (BTU/h)	Acoustic Noise Level (dB)
HCP G10 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

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

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

Required tools and supplies

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

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

- **Lift** — Depending on the type of storage devices used in conjunction with the HCP system, a lift may be required to install or maintain disk storage trays into a rack. The lift must be rated at a minimum of 400 pounds (182kg).

- **Tools** — For installation and maintenance procedures on an HCP system, the following tools may be required:
  - #1 Phillips screwdriver
  - #2 Phillips screwdriver
  - ¼" straight screwdriver
  - Caged nut tool
  - Wire cutter
- **Keyboard and monitor** — For the installation of the HCP G10 software, or to perform diagnostics and recover the HCP G10 software, you need a USB keyboard and VGA monitor.
- **Laptop computer** — To upload an HCP G10 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 G10 software installation, you need one 4GB or greater USB flash drive. For the best results, use the certified HDS part number DTI4GL.P

3

Assembling rackless components

The components of a rackless HCP G10 with Attached Storage system are delivered configured but unassembled. You need to provide some additional components and assemble the system at your site. This chapter provides instructions for doing this.

Components that come with a rackless system

For a rackless HCP G10 with Attached Storage system, the components are shipped to your site:

- The required numbers of nodes, with the HCP software already installed.
- The required number of storage arrays, with the HCP software already installed.
- One or Two Ethernet switches for the back-end network. The type and quantity of Ethernet switches you receive depends on your system network configuration. The possible switch types are:
    - **Brocade ICX 6430** — is a small, 1 GB Ethernet switch. You receive two Brocade ICX 6430 switches with your system.
    - **HP ProCurve 4208VL** — is a large, 1 GB switch. You receive one HP 4208VL switches with your system.
    - **Brocade VDX 6740** — is a small, 10 GB Ethernet switch. You receive two Brocade VDX 6740 switches with your system.
    - **Cisco Nexus 5548UP** — is a small, 10 GB Ethernet switch. You receive two Cisco Nexus 5548 switches with your system.

  - **Cisco Nexus 5596UP** — is a large, 10 GB Ethernet switch. You receive two Cisco Nexus 5596 switches with your system.

- Depending on your order, you might receive two Fibre Channel switches. The possible switch types are:

  - **Cisco MDS 9148S** — is a small, 8 GB switch. You receive two Cisco 9148S switches with your system.

  - **Brocade 6510** — is a small, 8 GB switch. You receive two Brocade 6510 switches with your system.

- If you use a 1G network configuration, you are supplied with the required number of Ethernet cables harnesses, half red and half blue. If you use a 10G network configuration, you are supplied the required amount of Ethernet cables to connect your nodes to the back-end network.

- The required amount of Fibre Channel cables to connect your nodes to the Fibre Channel switches or storage array.

- The required amount of Power cords for the nodes, storage array, Fibre Channel switches, and back-end switches.

- An Ethernet cable for connecting back-end switches to each other if you are using a network configuration that supports two back-end switches — one purple cable for a 1 G network configuration or one black cable for a 10 G network configuration.

- The required number of perforated blanking plates for covering the back-end switches.

- One serial number label per system. This label is on the lower left side of the lowest node.

- The license-key packet. If the HCP software was installed with encryption enabled, this packet also includes the Encryption Key form.

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 SAIN system, follow the steps outlined in the table below.

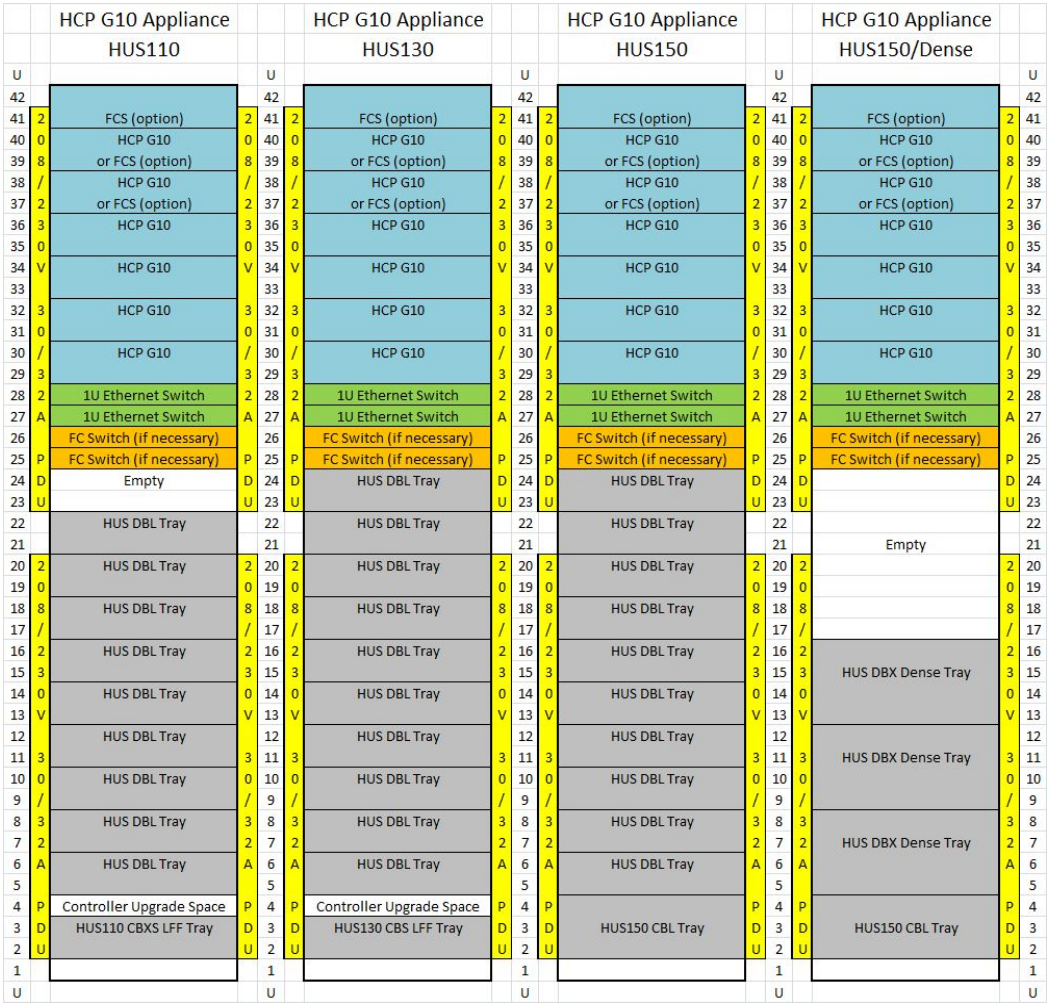
Step	Activity	More information
1	Prepare the rack for installation of the HCP system components.	Step 1: "Prepare the racks" on page 32
2	Attach the HCP G10 System serial number sticker	Step 2: "Attach the HCP G10 system serial number" on page 32
3	Install the PDUs in the rack.	Step 3: "Install the PDUs" on page 33
4	Rack the HCP S10 Nodes	Step 4 (conditional): "Rack the HCP S10 Nodes" on page 34
5	Optionally, rack the VSP-G storage array	Step 5 (conditional): "Rack the VSP-G" on page 36
6	Optionally, rack the HUS storage array	Step 6 (conditional): "Rack the HUS" on page 40
7	Rack the HCP G10 Nodes	Step 7: "Rack the HCP G10 Nodes" on page 44
8	Rack the Fibre Channel switches	Step 8 (conditional): "Rack the Fiber switches" on page 54
9	Rack the Ethernet switches	Step 9: "Rack the Ethernet Switches" on page 78
10	Reassemble the rack.	Step 10: "Reassemble the racks" on page 124

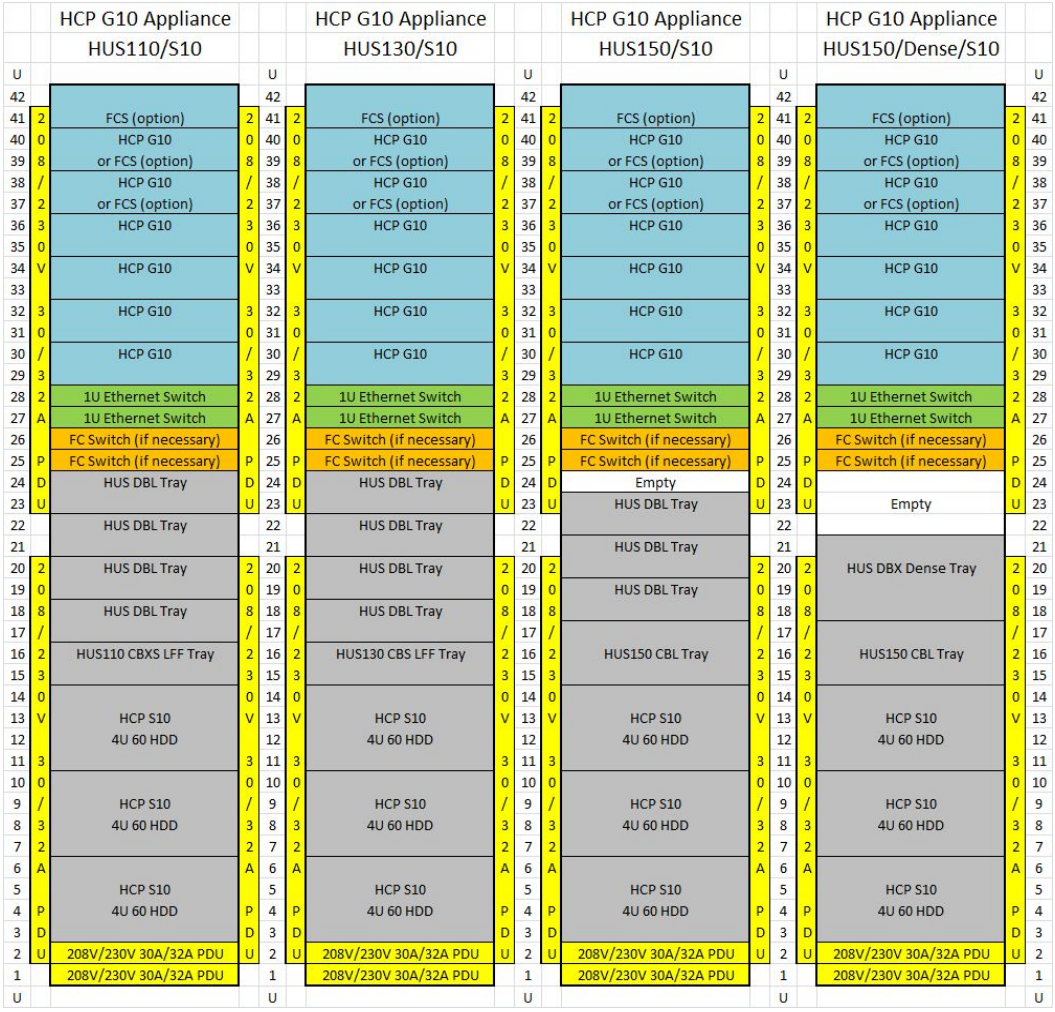
Considerations for racking an HCP G10 system with Attached Storage

An HCP G10 system can be composed of exclusively HCP G10 nodes and their internal storage or also include additional external storage components.

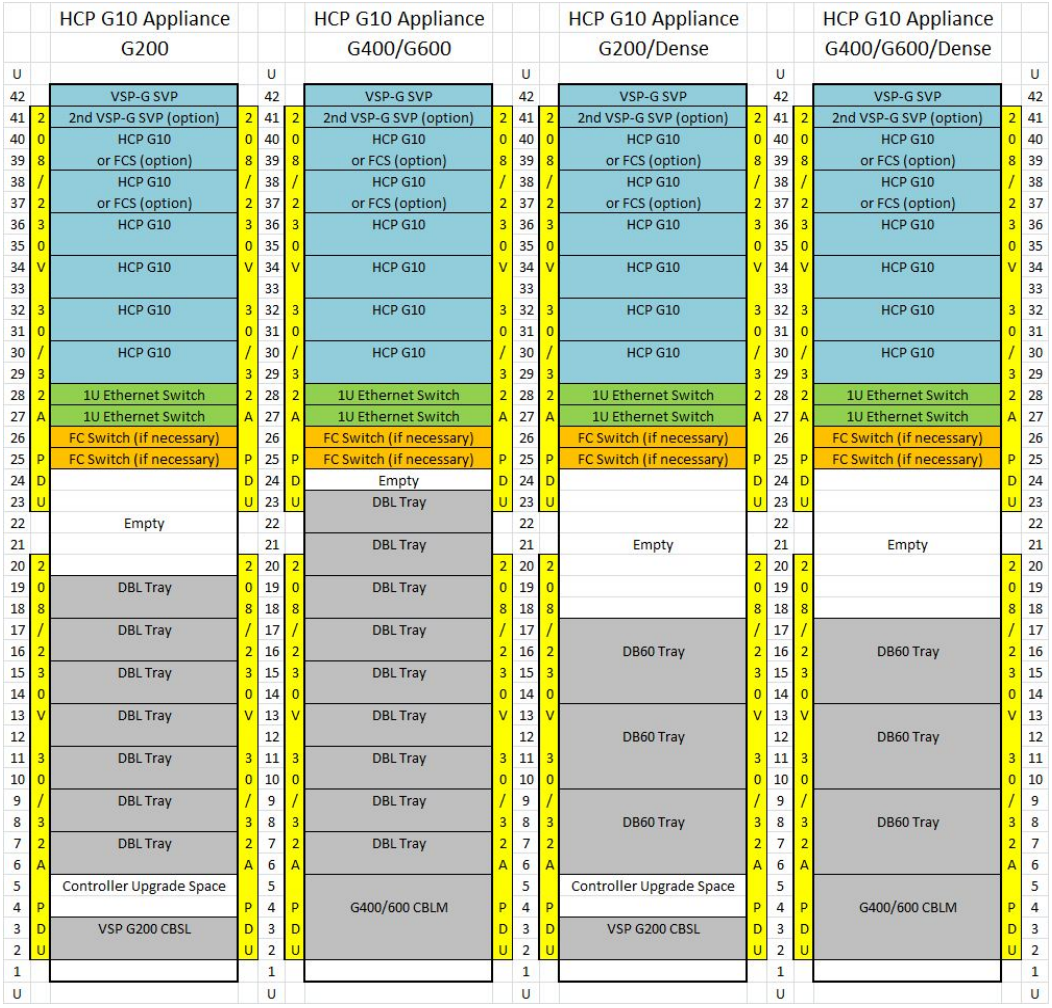
If the HCP system contains no more than six HCP G10 nodes and also contains external storage components which fit into the rack guides shown below, the system should be built as a single rack appliance configuration.

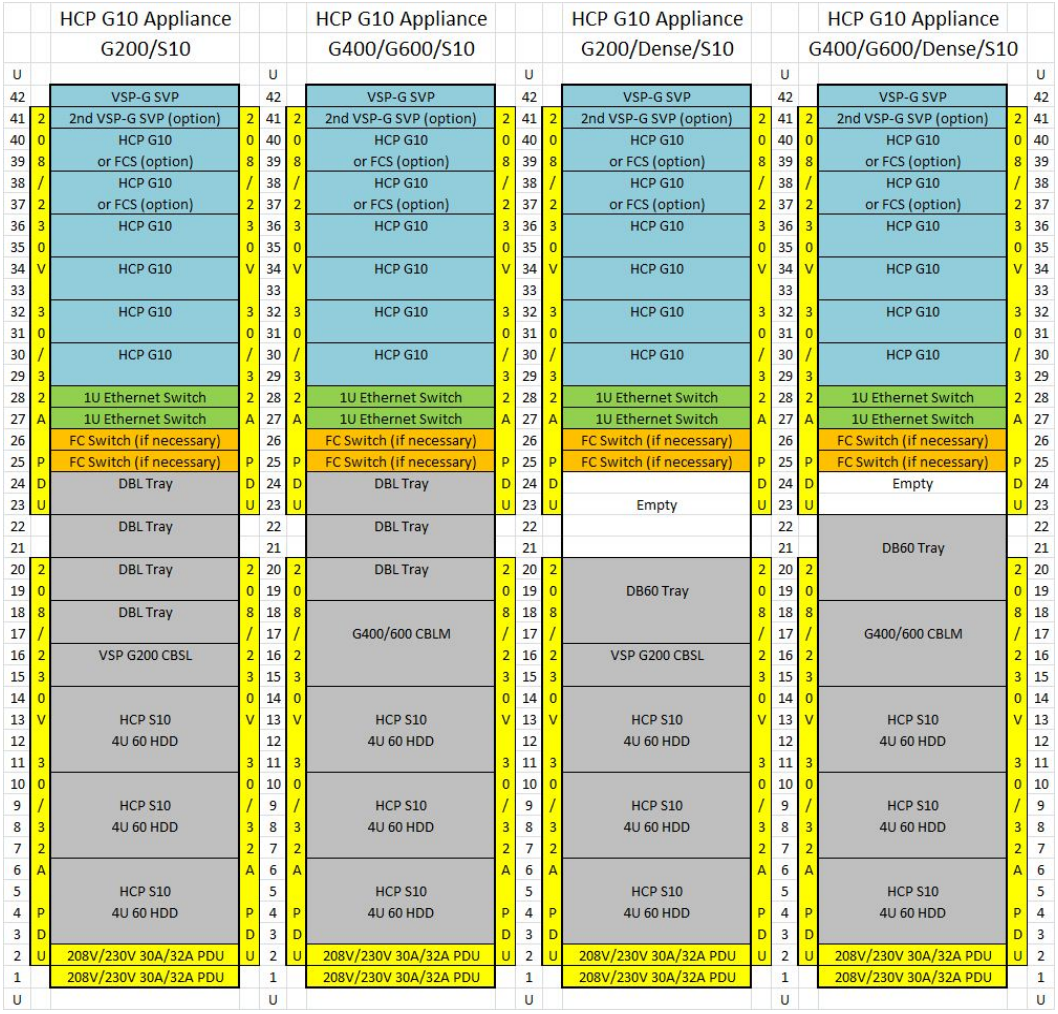
Attached storage systems being built with a HUS array and optionally HCP S10 nodes are assembled as depicted in the diagrams below.



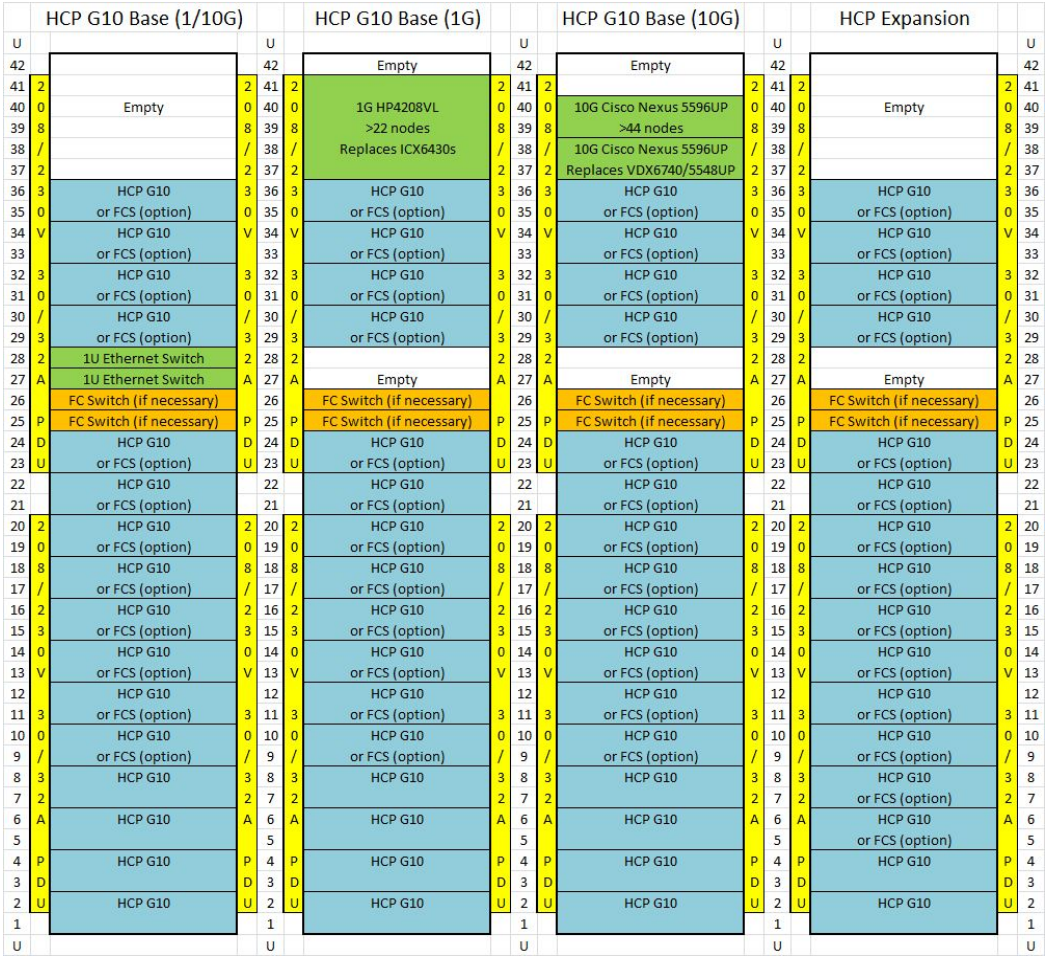


Attached storage systems being built with a VSP-G array and optionally HCP S10 nodes are depicted in the diagrams below.


HCP G10 Appliance
G200
VSP-G SVP
2nd VSP-G SVP (option)
HCP G10
or FCS (option)
HCP G10
HCP G10
HCP G10
HCP G10
1U Ethernet Switch
1U Ethernet Switch
FC Switch (if necessary)
FC Switch (if necessary)
Empty
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
Controller Upgrade Space
VSP G200 CBSL
HCP G10 Appliance
G400/G600
VSP-G SVP
2nd VSP-G SVP (option)
HCP G10
or FCS (option)
HCP G10
HCP G10
HCP G10
HCP G10
1U Ethernet Switch
1U Ethernet Switch
FC Switch (if necessary)
FC Switch (if necessary)
Empty
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
DBL Tray
G400/600 CBLM
HCP G10 Appliance
G200/Dense
VSP-G SVP
2nd VSP-G SVP (option)
HCP G10
or FCS (option)
HCP G10
HCP G10
HCP G10
HCP G10
1U Ethernet Switch
1U Ethernet Switch
FC Switch (if necessary)
FC Switch (if necessary)
Empty
DB60 Tray
DB60 Tray
DB60 Tray
Controller Upgrade Space
VSP G200 CBSL
HCP G10 Appliance
G400/G600/Dense
VSP-G SVP
2nd VSP-G SVP (option)
HCP G10
or FCS (option)
HCP G10
HCP G10
HCP G10
HCP G10
1U Ethernet Switch
1U Ethernet Switch
FC Switch (if necessary)
FC Switch (if necessary)
Empty
DB60 Tray
DB60 Tray
DB60 Tray
G400/600 CBLM



If the HCP system contains more than six HCP G10 nodes, or the HCP system contains only HCP nodes and switches with external storage components housed in their own racks, the system should be built as a base system with optional expansion racks. The following diagrams show the various configuration options for the base rack. If there are additional nodes which do not fit in the base rack, the expansion rack diagram shows the layout for additional HCP G10 racks.



In the diagrams shown above, the placeholder labeled *1U Ethernet Switch*, can be a Brocade ICX 6430 1G Ethernet switch, a Brocade VDX 6740 10G Ethernet switch, or a Cisco Nexus 5548UP 10G Ethernet switch.

Please select the appropriate diagram from the ones shown above and use it as reference for the racking of the various system components.

A base HCP G10 system contains a minimum of four HCP G10 Nodes. The nodes can be ordered alone or with HCP S10 Nodes and optional FCS components. For HCP systems with attached storage, the order also includes an external storage array.

Racked systems always have four PDUs mounted vertically, two on the right and two on the left side of each rack (upper and lower). The four PDUs are used to power all G10 Nodes, Ethernet switches, Fibre Channel switches, storage arrays and optional FCS components.

If HCP S10 nodes are included, two additional PDUs are mounted horizontally, and are used to power the HCP S10 units.

All Ethernet switches mentioned in this chapter are back-end switches. The customer is responsible for providing front-end network connectivity to the HCP G10 nodes and optional HCP S10 nodes.

To ensure the rack looks professional when shipped to a customer, all unused U positions on the front of the rack should be covered with blanking plates to cover the spaces. In certain instances, the blanking plates are perforated to ensure proper airflow and cooling for the devices. In all other cases, use the solid plastic blanking plates which come from the rack or from the parts crib.

Note: It's recommended to remove and set aside the rack side panels and doors for the duration of the assembly process. It is much easier to work on racking components, cabling, and tying off of power cables when the areas are easily accessible.

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.

Ensure that you use blanking panels to cover all unused spaces in the front of the rack and that you use perforated panels where an airflow is required.

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. Quanta D51B-2U 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.

Tools and accessories you need

To assemble an HCP G10 with Attached Storage system, you need these tools:

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

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

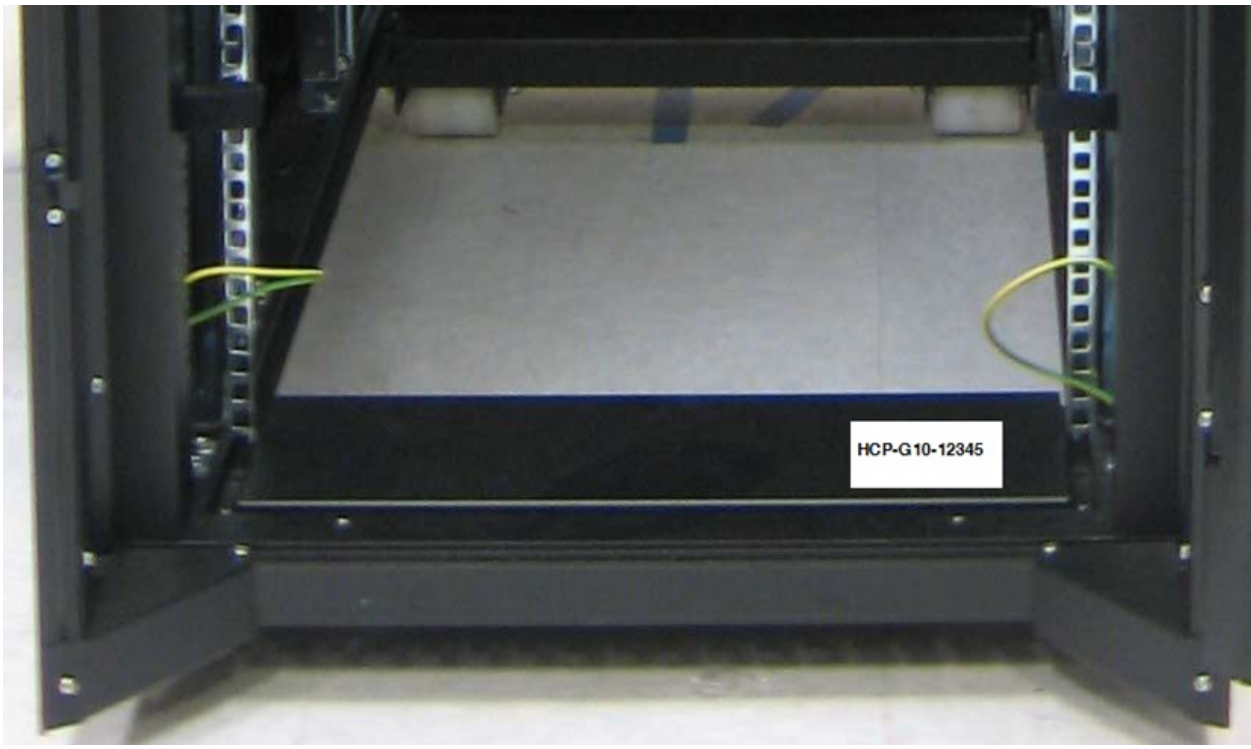
Step 1: Prepare the racks

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

Step 2: Attach the HCP G10 system serial number

Each HCP G10 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 G10 system serial number stickers are applied to the bottom right of the front side of Appliance or Base racks.



To attach an HCP G10 serial number sticker to the rack:

1. Locate the area where the sticker will be applied and clean it. The surface needs to be dry. If you feel it's necessary, use alcohol to clean the surface.

2. Remove the serial number sticker from the backing liner without touching the adhesive side.

3. Attach the serial number sticker by sticking it on the rack and sliding your finger across it from left to right.

Step 3: Install the PDUs

If the PDUs are not already installed in the rack, install them now. Attach them to the vertical rails at the back of the rack. If you're using two PDUs, attach one to each side of the rack. If you're using four, attach two to each side.

Step 4 (conditional): Rack the HCP S10 Nodes

This section describes the rack layout when HCP S10 Nodes are added to the HCP system.

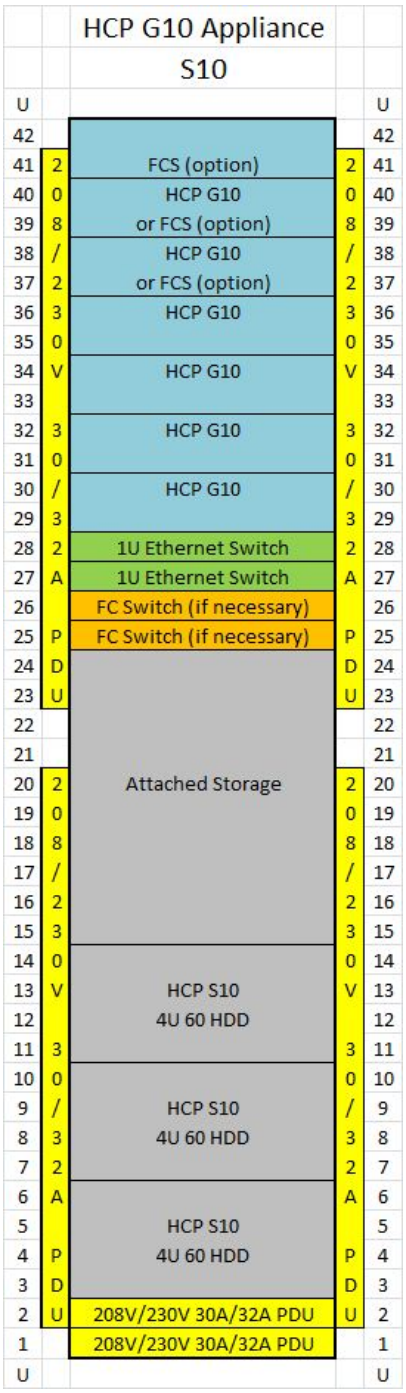
HCP G10 system with HCP S10 Node racking

An HCP G10 system can support up to three HCP S10 Nodes racked with up to six HCP nodes in a single rack as an Appliance configuration. If the HCP system ordered has HCP S30 Nodes or more than three HCP S10 Nodes, the S Series Nodes should be racked in separate racks, and the HCP nodes should be racked as a Base/Expansion system.

If the HCP G10 system is built as a single rack Appliance configuration with up to three HCP S10 Nodes, the HCP S10 Nodes are racked first as the bottom components in the rack.

For more information on HCP S10 installation and configuration, see the *HCP S10 Assembly and Configuration* documentation.

The diagram below shows rack elevations for an HCP G10 system with attached storage.



For S10 Nodes, two PDUs are mounted horizontally at rack units 01 and 02. The PDUs can support up to three S10 Nodes. The S10 Node enclosures should be installed at rack unit 03 and go up from there. One HCP S10 Node consumes four rack units worth of space.

Step 5 (conditional): Rack the VSP-G

This section describes the rack layout when a VSP-G (HM800) storage array is added to the HCP system.

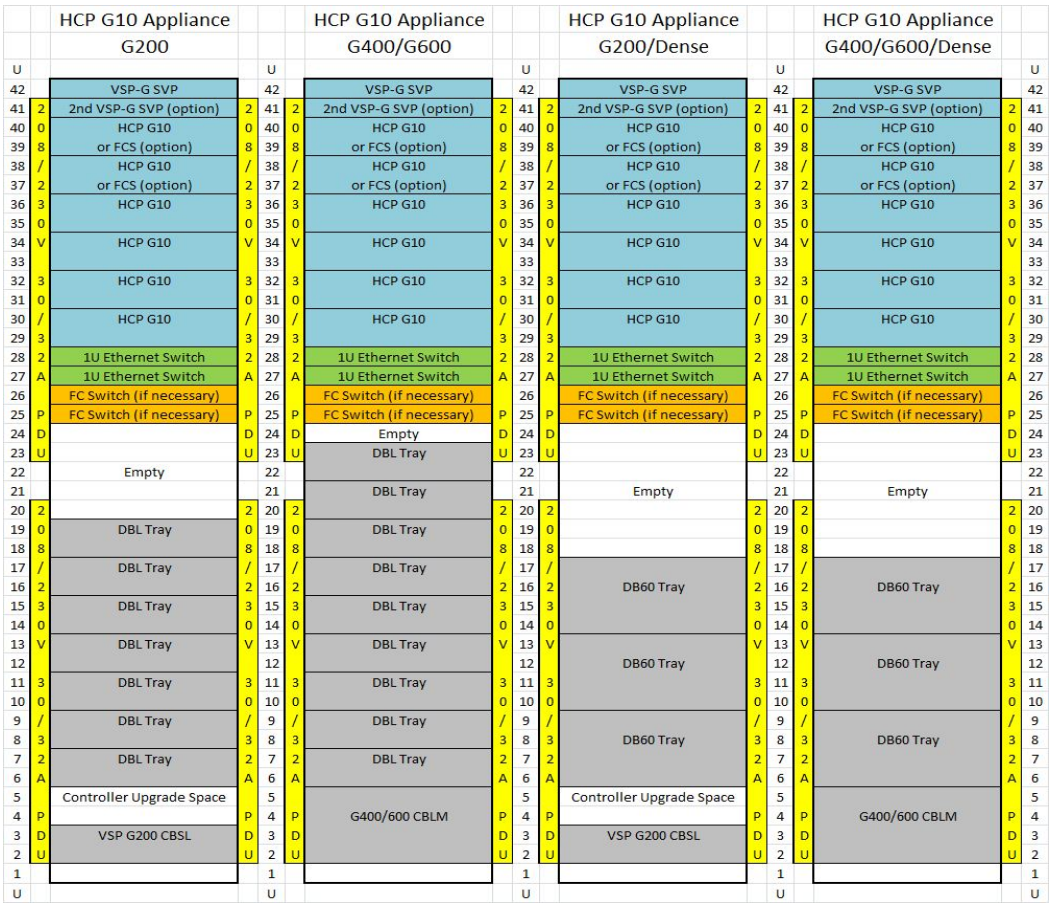
HCP G10 system with VSP-G racking

An HCP G10 system can support three models of Hitachi Virtual Storage Platform G (VSP-G) array controllers: G200, G400 and G600. Technically, the G800 and G1000 can also be attached to an HCP G10 system, but these models are not covered in this documentation. A VSP-G storage array can directly connect to eight HCP G10 Nodes. If the system has more than eight server nodes, you need Fibre Channel switches to connect the nodes and storage arrays.

Since storage array components are heavy, they are designated to the bottom half of the server racks. The top half of the rack is reserved for HCP G10 Nodes or other FCS components. If the system has multiple storage arrays, they should be mounted in separate racks and connected to the servers using Fibre Channel switches.

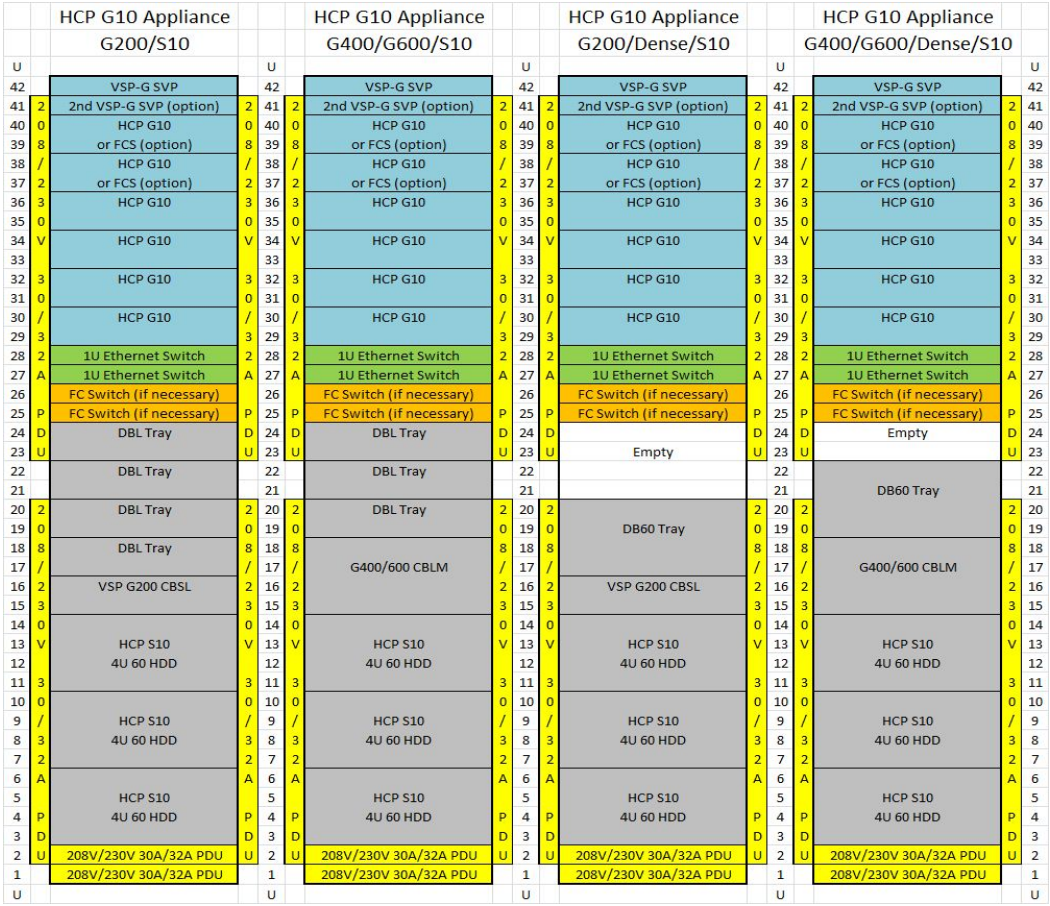
HCP G10 Appliance with VSP-G attached storage

If there are six or fewer HCP G10 nodes in the system and the ordered array storage fits in the same rack as the HCP components according to one of the following diagrams, rack the VSP-G storage based on the appropriate diagram below. Rack the VSP-G components using the appropriate VSP-G installation documentation.



VSP attached storage with S10 node configurations

If there are six or fewer HCP G10 nodes in the system, three or fewer HCP S10 nodes, and the array storage ordered fits in the same rack as the HCP components according to one of the following diagrams, rack the HCP S10 and VSP-G storage based on the appropriate diagram below. Rack the HCP S10 nodes first, using the *HCP S10 Assembly and Configuration* documentation. Rack the VSP-G components second using the appropriate VSP-G installation documentation.



This document does not include instructions on how to mount the VSP-G storage components in racks. For more information on mounting VSP-G storage, see the applicable documentation.

Connect the VSP-G power cables to the PDUs

In order to connect power cords between the HUS and the installed PDUs, ensure that:

Note: This PDU connection information is specific to HDS PDUs. If youare supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

1. If the rack has VSP-G storage but not S10 storage and:

   a. If the VSP-G is not using DB60 trays:

- The DBL trays in positions U12, U14, U16, U18, U20, and U22 should be plugged into outlets in the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper circuit breaker.

- The controller in U02 and the DBL trays in positions U06, U08, and U10 should be plugged into outlets in the bottom half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the lower circuit breaker.

b. If the HUS has DB60 trays:

- The DB60 trays in positions U10 and U14 should be plugged into outlets in the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the the upper circuit breaker.

- The controller in position U02 and the DB60 tray in position U06 should be plugged into outlets in the bottom half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

2. If VSP-G storage and S10 storage are both included in the rack, all VSP-G components should be plugged into the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

3. Do not plug devices into the bottom half outlets on the left or right lower PDUs in the rack.

4. HCP S10 nodes are plugged into two horizontally mounted PDUs. For more information on connecting S10 nodes, see the *HCP S10 Assembly and Configuration* documentation.

5. Tie off any excess length of the power cords neatly within the rack without obstructing any air flow at the rear of the rack components.

Step 6 (conditional): Rack the HUS

This section describes the rack layout when a HUS storage array is added to the HCP system.

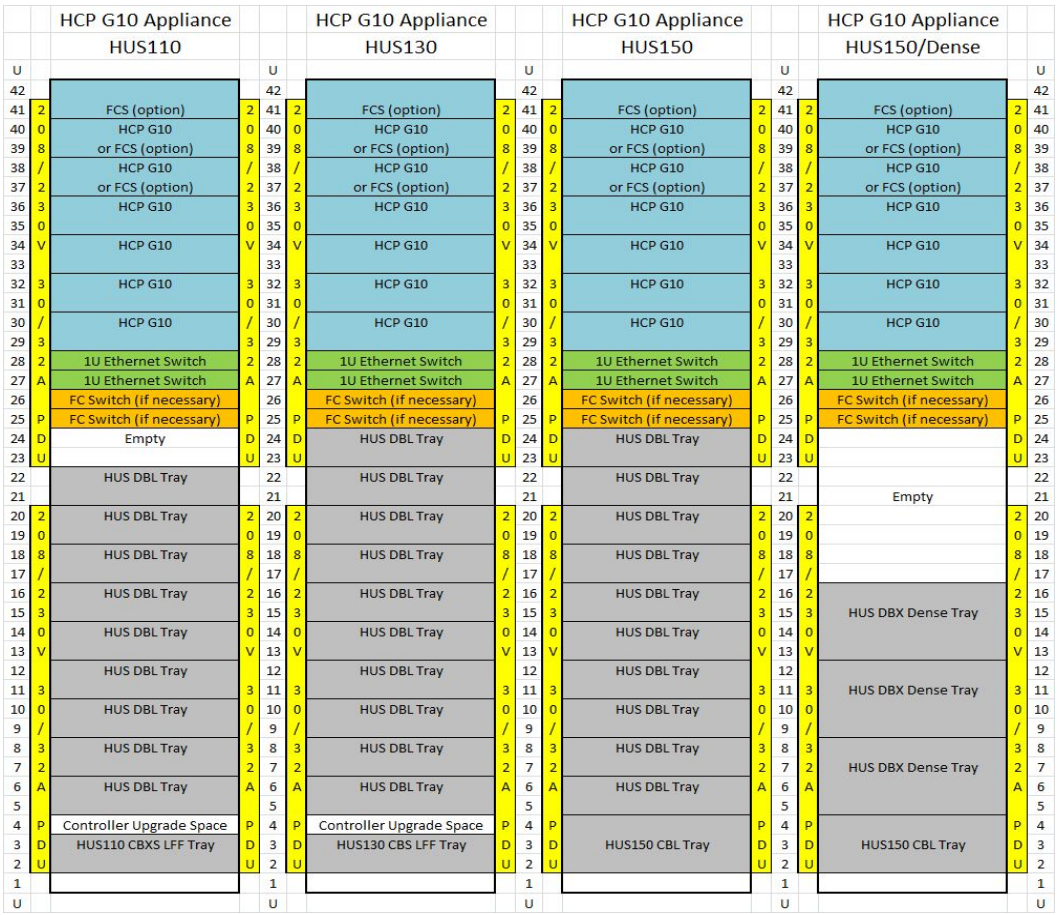
HCP G10 system with HUS racking

An HCP G10 system can support three models of Hitachi Unified Storage (HUS) array controllers: HUS110, HUS130, and HUS150. A HUS storage array can directly connect to eight HCP G10 Nodes. If the system has more than eight server nodes, you need Fibre Channel switches to connect the nodes and storage arrays.

Since storage array components are very heavy, they are designated to the bottom half of the server racks. The top half of the rack is reserved for HCP G10 Nodes or other FCS components. If the system has multiple storage arrays, they should be mounted in separate racks and connected to the servers using Fibre Channel switches.

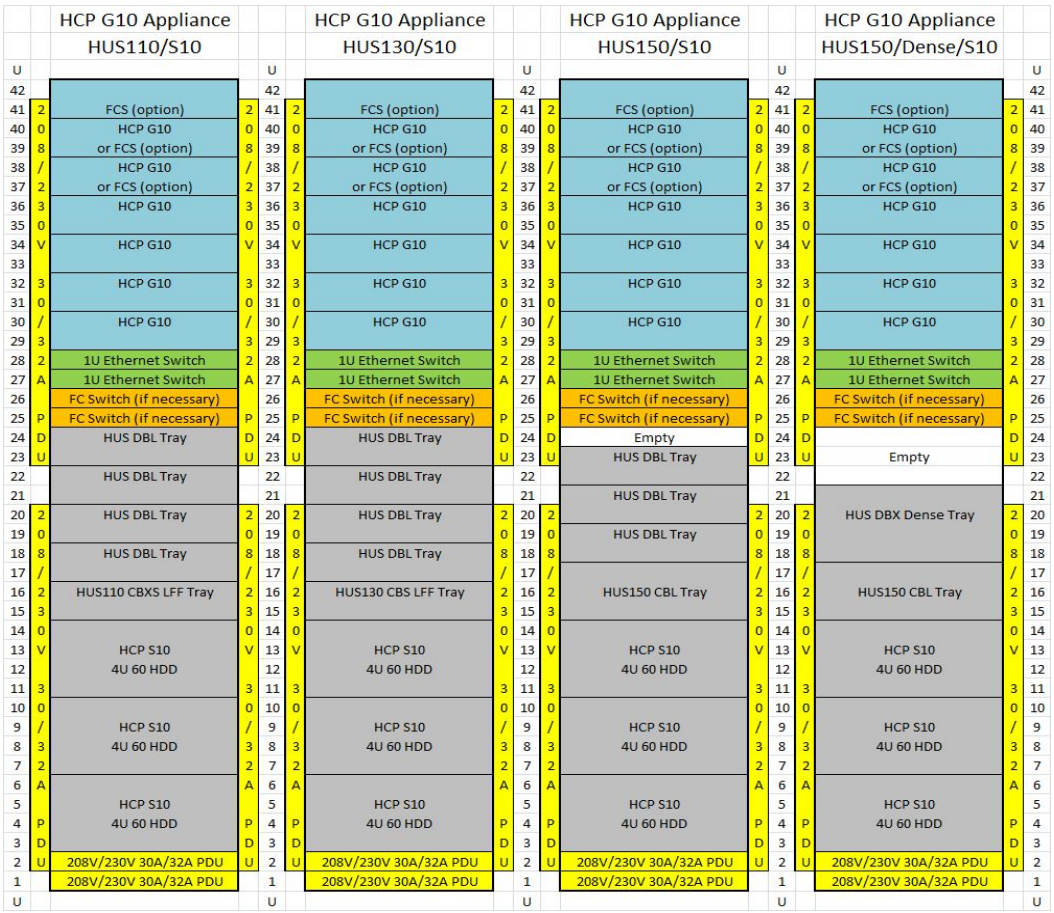
HCP G10 Appliance with HUS attached storage

If there are six or fewer HCP G10 nodes in the system and the ordered array storage fits in the same rack as the HCP components according to one of the following diagrams, rack the HUS storage based on the appropriate diagram below. Rack the HUS components using the appropriate HUS installation documentation.



HCP G10 Appliance with HUS attached storage and S10 nodes

If there are six or fewer HCP G10 nodes in the system, three or fewer HCP S10 nodes, and the ordered array storage fits in the same rack as the HCP components according to one of the following diagrams, rack the HCP S10 and HUS storage based on the appropriate diagram below. Rack the HCP S10 nodes first. For more information on racking HCP S10 nodes, see the *HCP S10 Assembly and Configuration* documentation. Rack the HUS components second using the appropriate HUS installation documentation.



This document does not include instructions on how to mount the HUS storage components in racks. For more information on mounting HUS storage, see the applicable documentation.

Connect the HUS power cables to the PDUs

In order to connect the power cords between the HUS and the installed PDUs, you need to ensure that:

Note: This PDU connection information is specific to HDS PDUs. If youare supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

1. If HUS storage is included in the rack, but there are no S10 nodes in the rack and:

   a. If the HUS is not using DBX trays:

- The DBL trays in positions U13, U15, U17, U19, U21, and U23 need to be plugged into outlets in the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

- The controller in U02 and the DBL trays in positions U05, U07, U09, and U11 should be plugged into outlets in the bottom half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

b. If the HUS has DBX trays:

- The DBX trays in positions U09 and U13 should be plugged into outlets in the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

- The controller in position U02 and the DBX tray in position U05 should be plugged into outlets in the bottom half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

2. If there is HUS storage and S10 storage included in the rack, all HUS components should be plugged into the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the components should be connected to the lower left PDU. Power supplies on the right side of the components should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

3. Do not plug any devices into the bottom half outlets on the left or right lower PDUs in the rack.

4. HCP S10 nodes are plugged into two horizontally mounted PDUs. For more information on connecting S10 nodes, see the *HCP S10 Assembly and Configuration* documentation.

5. Tie off any excess length of the power cords neatly within the rack without obstructing any air flow at the rear of the rack components.

Step 7: Rack the HCP G10 Nodes

If you are building an HCP G10 Appliance configuration, all of the storage components should be installed in the rack. This section focuses on racking the HCP G10 Nodes built in the previous chapter. An Appliance configuration supports up to six HCP G10 Nodes in the rack.

If you are building an HCP G10 Base/Expansion configuration, the HCP G10 nodes built in the previous chapter are the first components to be installed in the rack. A Base/Expansion configuration supports up to eighty HCP G10 Nodes.

Each HCP G10 Node consumes two units of rack space.

HCP G10 system HCP G10 Node racking

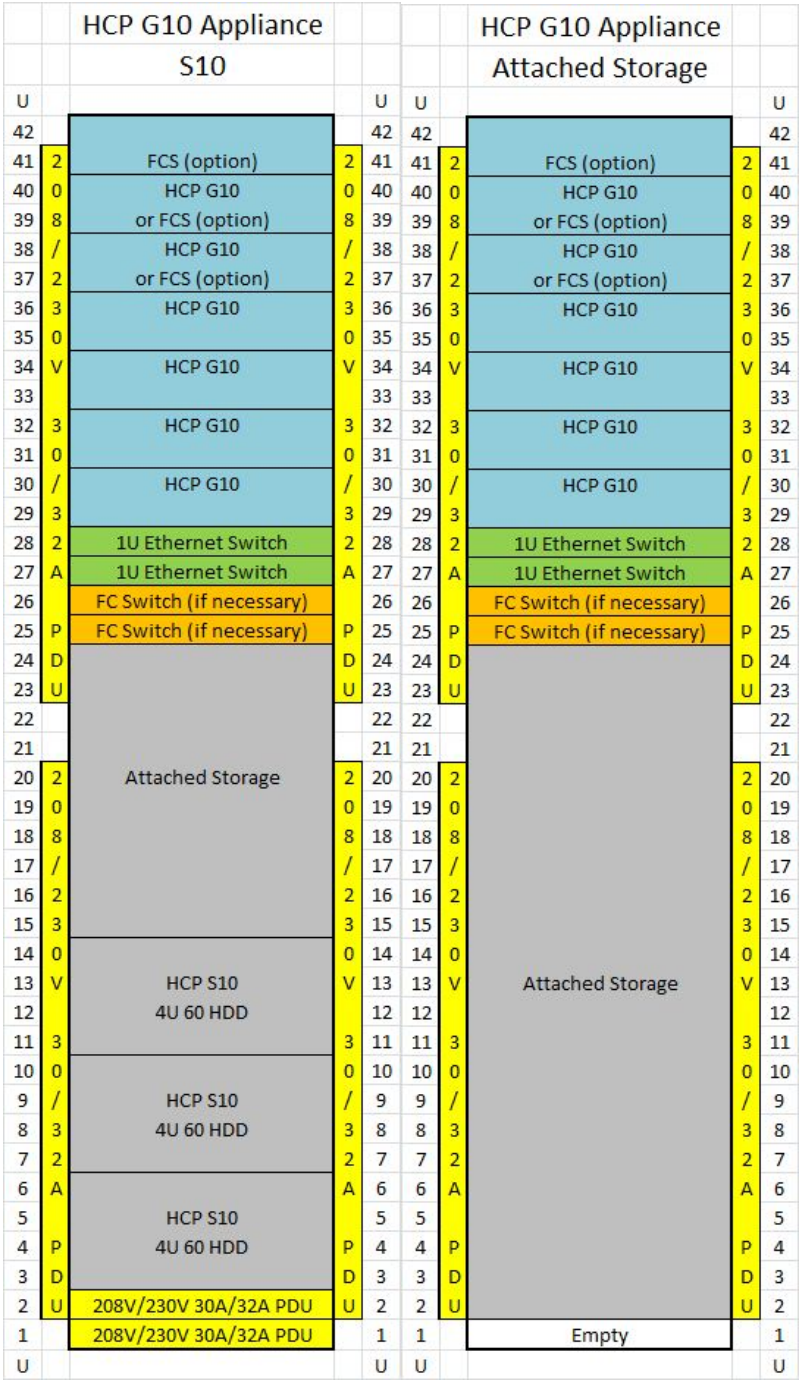
An HCP G10 system contains a minimum of four HCP G10 Nodes and a maximum of eighty HCP G10 Nodes. Before racking any of the HCP G10 Nodes, determine whether the system being built is an Appliance configuration or a Base/Expansion configuration.

If there are six or fewer HCP G10 Nodes and there are HCP S10 Nodes or there is a storage array racked from the previous steps in this chapter, rack the HCP G10 system as an Appliance configuration.

If there are more than six HCP G10 Nodes or there are no HCP S10 Nodes, or if the storage arrays included are being racked in separate racks, rack the HCP G10 system as a Base/Expansion configuration.

Racking the HCP G10 Nodes in an Appliance configuration

HCP G10 Nodes in an Appliance configuration are racked starting at position U29 as shown in the following diagrams.



Racking the HCP G10 Nodes in a Base/Expansion configuration

In the Base/Expansion configuration, the first sixteen HCP G10 Nodes are racked starting at the bottom of the Base rack, which also contains the HCP G10 system back-end Ethernet switches. Additional nodes are racked, up to

sixteen per rack, using the Expansion rack layout. The various Base rack elevation diagrams along with the Expansion rack elevation diagram are shown below.

Install the HCP G10 Nodes according to the proper configuration and the installation procedures shown in the following sections. Repeat the installation steps shown below for each HCP G10 Node to be racked.

Step 7a: 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.

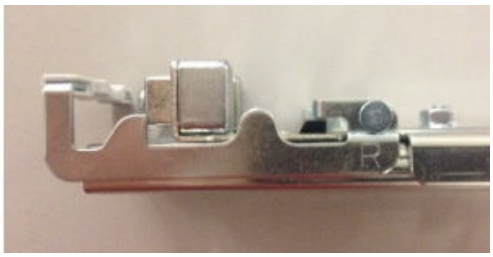
In a new serverrail kit, the inner rails are nested inside the outer rails. You need to separate them before you can attach the inner rails to the server and the outer rails in the rack.

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

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

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

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



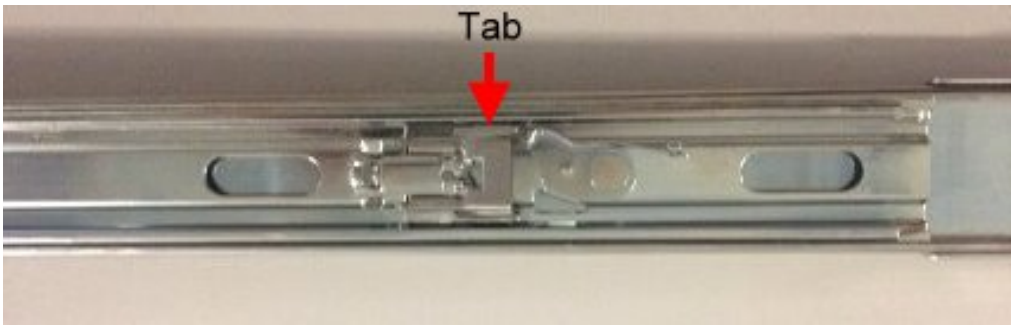
To separate the inner and outer server rails:

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

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

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

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

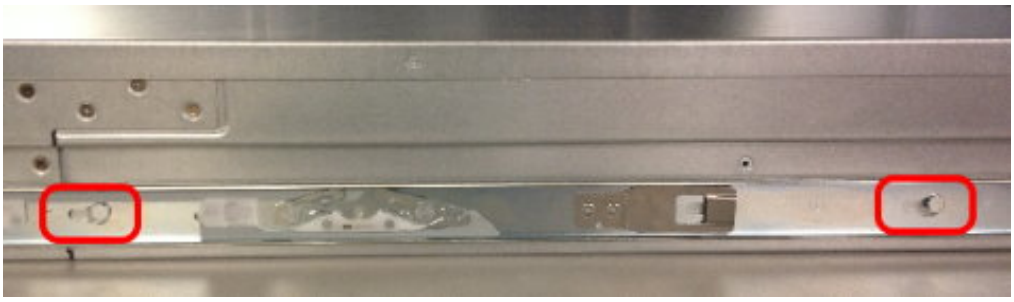


Step 7b: Attach the inner rails to the server

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

To attach an inner rail to a server:

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



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

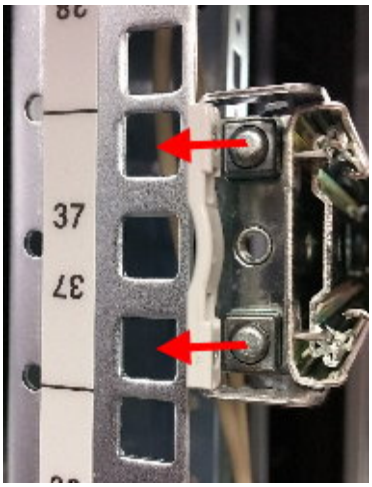
Step 7c: Install the outer server rails in the rack

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.

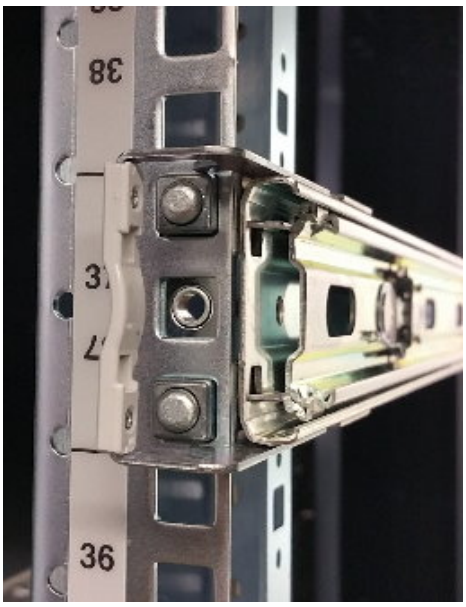
The outer rails are installed in the lower of the two rack units the server will occupy. For example, if the server will occupy rack units 37 and 38, the outer rails are installed in rack unit 37.

To install an outer rail in the rack:

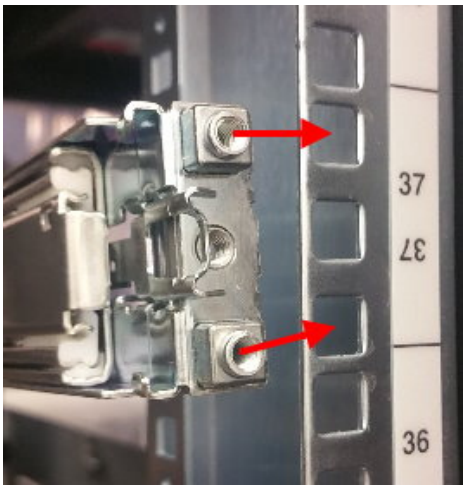
1. At the rear of the rack, with the inside of the outer rail facing into the rack, align the two square studs at the rear of the rail with the back of the top and bottom square holes for the applicable rack unit in the cage rail.



2. Fit the studs into the holes in the cage 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 cage rail.



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

Step 7d: Mount the server in the rack

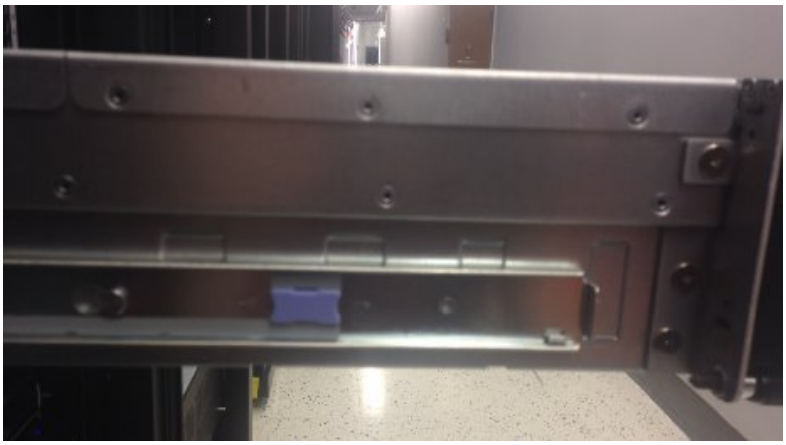
To mount a server in a rack:

1. Ensure that the inner part of each outer rail for the server is pushed all the way back into the rack.

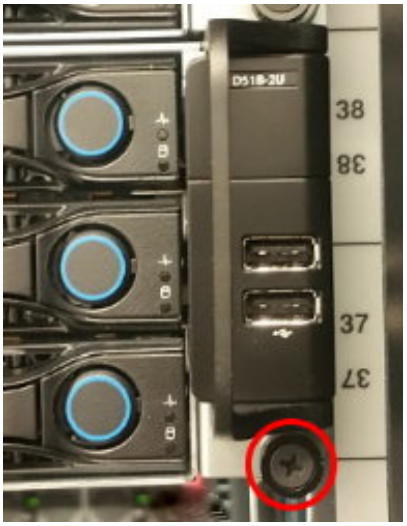
2. At the front of the rack, align the rear of the inner rails on the server with the front of the outer rails on the rack.

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 it goes.

4. While pushing back or pulling forward the purple tabs on the outsides of both inner rails on the server, push back on the server to release it. Then slide the server all the way back into the rack.



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



Step 7e: Connect the HCP G10 power cables to the PDUs

In order to connect the power cords between the HCP G10 Nodes and the installed PDUs ensure that:

Note: This PDU connection information is specific to HDS PDUs. If youare supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

1. If you are building an Appliance configuration:

   a. HCP G10 Nodes in rack unit positions U33, U35, U37, U39, and U41 are plugged into outlets in the top half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the HCP G10 Nodes should be connected to the upper left PDU. Power supplies on the right side of the HCP G10 Nodes are connected to the upper right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

   b. HCP G10 Nodes in rack unit positions U29 and U31 are plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the HCP G10 Nodes should be connected to the upper left PDU. Power supplies on the right side of the HCP G10 Nodes should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

2. If you are building a Base/Expansion configuration:

   a. HCP G10 Nodes in rack unit positions U29, U31, U33, and U35 are plugged into outlets in the top half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the HCP G10 Nodes should be connected to the upper left PDU. Power supplies on the right side of the HCP G10 Nodes should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

   b. HCP G10 Nodes in rack unit positions U21 and U23 are plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the HCP G10 Nodes should be connected to the upper left PDU. Power supplies on the right side of the HCP G10 Nodes should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

   c. HCP G10 Nodes in rack unit positions U11, U13, U15, U17, and U19 are plugged into outlets in the top half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the HCP G10

Nodes should be connected to the lower left PDU. Power supplies on the right side of the HCP G10 Nodes should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

d. HCP G10 Nodes in rack unit positions U01, U03, U05, U07, and U09 are plugged into outlets in the bottom half of the left and right lower zero U mounted PDUs. Power supplies on the left side of the HCP G10 Nodes should be connected to the lower left PDU. Power supplies on the right side of the HCP G10 Nodes should be connected to the lower right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

3. Tie off any excess length of power cords neatly within the rack without obstructing any air flow at the rear of the rack components.

Step 8 (conditional): Rack the Fiber switches

HCP G10 systems with attached storage may include Fibre Channel switches to connect the HCP G10 Nodes to the storage arrays. HCP supports Brocade 6510 and Cisco MDS 9148s switches for Fibre Channel connections. If Fibre Channel switches are included with the order, there are two switches per rack for redundancy. Each Fibre Channel switch takes up one rack unit of space.

Alternatively, the HCP G10 Nodes can be directly connected to one or more storage arrays. If there are no Fibre Channel switches included with the order, the nodes are directly connected to the storage arrays.

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.

Connecting HCP G10 Nodes to Fibre Channel switches or storage arrays

An HCP G10 system can use Fibre Channel switches when you need to connect more than eight server nodes to a single storage array or when you need to connect nodes to external storage arrays contained in separate racks. If the ordered HCP system has Fibre Channel switches included with the order, the switches need to be installed in positions U25 and U26 for every HCP G10 rack.

There are two types of Fibre Channel switches offered with the HCP G10 system, each with forty eight 16Gbps ports, the Brocade 6510 and the Cisco MDS 9148S. Follow the installation steps for the switch type included in the order and mount them in all applicable racks. When finished, proceed to the fiber optic cabling section to connect the switches to the HCP G10 nodes and the storage arrays.

An HCP G10 system can also have the HCP G10 Nodes directly connected to the storage arrays without the use of Fibre Channel switches.

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

Switch	More information
Direct connect between HCP G10 Nodes and storage arrays	"Fiber optic cabling between HCP G10 Nodes and storage arrays (direct connect)" below
Racking the Brocade 6510	"Racking the Brocade 6510" on the next page
Racking the Cisco MDS 9148	"Racking the Cisco MDS 9148S" on page 67

Fiber optic cabling between HCP G10 Nodes and storage arrays (direct connect)

Follow the instructions outlined below to attach fiber optic jumper cables directly from HCP G10 Nodes to storage arrays. The HCP G10 Nodes and the storage arrays must be in the same rack in an Appliance configuration in order to set up a direct connection without Fibre Channel switches. You can connect up to eight HCP G10 Nodes to a storage array.

In order to cable the HCP G10 Nodes to storage arrays:

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

2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

3. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the HCP G10 Nodes

according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the HCP G10 Node (node#-port). The information presented in the following table applies to HUS and VSP-G storage arrays. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to N01-PRI	C1-P1A to N01-SEC
C0-P0B to N02-PRI	C1-P1B to N02-SEC
C0-P0C to N03-PRI	C1-P1C to N03-SEC
C0-P0D to N04-PRI	C1-P1D to N04-SEC
C0-P0E to N05-PRI	C1-P1E to N05-SEC
C0-P0F to N06-PRI	C1-P1F to N06-SEC
C0-P0G to N07-PRI	C1-P1G to N07-SEC
C0-P0H to N08-PRI	C1-P1H to N08-SEC

4. Repeat steps 1 through 3 for each cable to be connected between the storage array and the HCP G10 Nodes. The number of cables is always an even number and all HCP G10 Nodes have two connections. Not all ports on the array may be utilized and fewer than eight nodes may be present.

5. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable and render the path unusable.

Racking the Brocade 6510

Brocade 6510 switches are Fibre Channel switches with 48 ports. 24 ports are active per switch. A pair of Brocade 6510 switches can connect up to sixteen G10 Nodes.

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

Step 8a: Unpack the Brocade 6510

To unpack the Brocade 6510 switch:

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

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

   Do not discard the additional items. Pack them together and set them aside.
7. To install the SFP (small form factor pluggable) modules into the switch, remove the required number of SFPs (small form factor pluggable) from their packaging, observing standard static electricity protection measures.

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

Step 8b: Install the Brocade 6510 rails

To attach the rails to the Brocade 6510 switches:

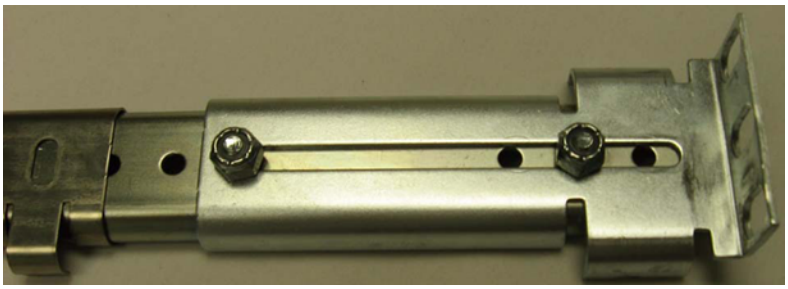
1. Attach the inner pieces of the rail kit to each side of the switch using the three screws below.

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

3. Install M5 caged nuts in all three square holes of U25 and U26 on the front of the rack on the left and right sides.

4. Using the top and bottom cage nuts on the left and right front of rack unit U25, secure the back ends of the outer rails to the racks.

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



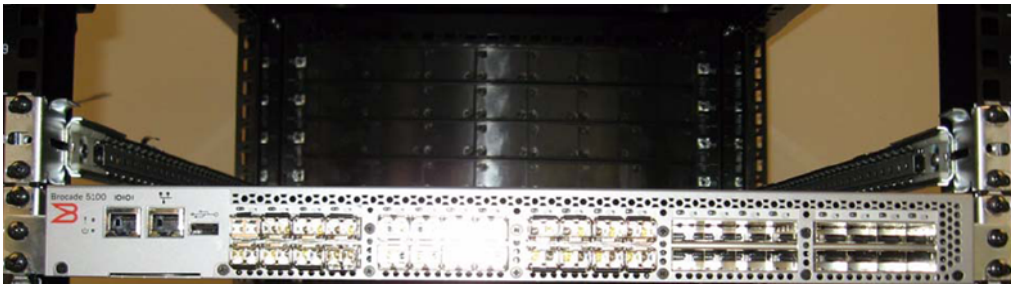
5. Repeat step 5 to secure the mounting rails for the switch to be mounted in rack position U26.

Step 8c: Mount the Brocade 6510 into the rack

To mount the switches in the racks:

1. Line up and slide the Brocade 6510 switch into the rails that are installed in the rack. Push the switch all the way into the rack.

2. Secure the port side of the switch using a screw in the middle square hole on both sides of rack unit U25.



3. Repeat steps 1 and 2 for the other switch at rack unit U26.

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

Step 8d: Connect the Brocade 6510 power cables to the PDUs

In order to connect the power cords between the Brocade 6510 and the installed PDUs, the Fibre Channel switches in rack units U25 and U26 need to be plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

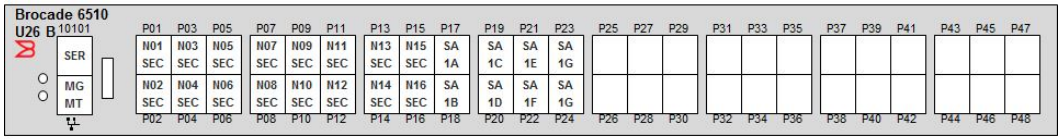
Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

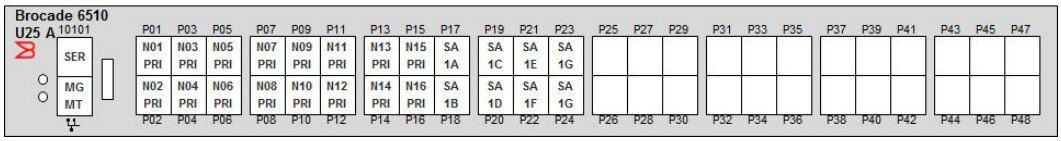
Step 8e: Brocade 6510 port diagram

An HCP system with Fibre Channel switches includes the proper number of fiber optic jumper cables needed to connect the HCP G10 Nodes and the storage arrays to the Fibre Channel switches. The order includes labels that need to be applied to the ends of the fiber optic cables to identify them for support purposes.

Dedicate one set of jumper cables to connecting the HCP G10 Nodes to the top Fibre Channel switch, labeled *B*. Dedicate the other set of jumper cables to connecting the HCP G10 Nodes to the bottom Fibre Channel switch, labeled *A*. A third set of jumper cables is used to connect the Fibre Channel switches to the storage arrays.

The diagrams below show the port layout for connecting the HCP G10 Nodes and storage arrays to the Brocade 6510 Fibre Channel switches.





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

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

Fibre Channel ports 1-16 on the switches are reserved for connections to the HCP G10 nodes. Fibre Channel ports 17-24 on the switches are reserved for connections to the storage arrays.

All connections between the HCP G10 Nodes and the Fibre Channel switches have redundant paths for fault tolerance. All connections between the storage arrays and the Fibre Channel switches have redundant paths across controllers for fault tolerance.

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

Step 8f: Cabling a Fibre Channel switch to a storage array

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

1. If the HCP system being built is an Appliance configuration:

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

   b. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

   c. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information in

the following table applies to HUS and VSP-G storage arrays. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

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

d. Repeat steps 1a through 1c for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables you connect is always be an even number, but you may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.

e. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.

2. If the HCP system being built is a Base/Expansion configuration:

   a. Based on the number of storage arrays attached to the system, determine which HCP G10 nodes will be attached to which storage array. Divide the number of HCP G10 nodes by the number of storage arrays. Since there are sixteen HCP G10 Nodes per HCP rack, determine the number of storage arrays that will be connected to the Fibre Channel switches in each HCP rack. If the number of nodes plus half of the number of storage array ports exceeds twenty-four, stop and contact HCP Product Management or HCP Engineering for further instructions on cabling for this order.

b. Select a fiber optic jumper cable of the appropriate length to reach from the Fibre Channel switches in the HCP rack and the storage controllers in the separate storage rack. Also, locate the label sheet containing pairs of numbered decals.

c. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

d. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the list of port pairs shown in step 1c above. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information presented in the following table applies to HUS and VSP-G storage arrays. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

e. Repeat steps 2b through 2d for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables is always an even number, but may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.

f. If there is more than one array, repeat steps 2b through 2e for each storage array on the order.

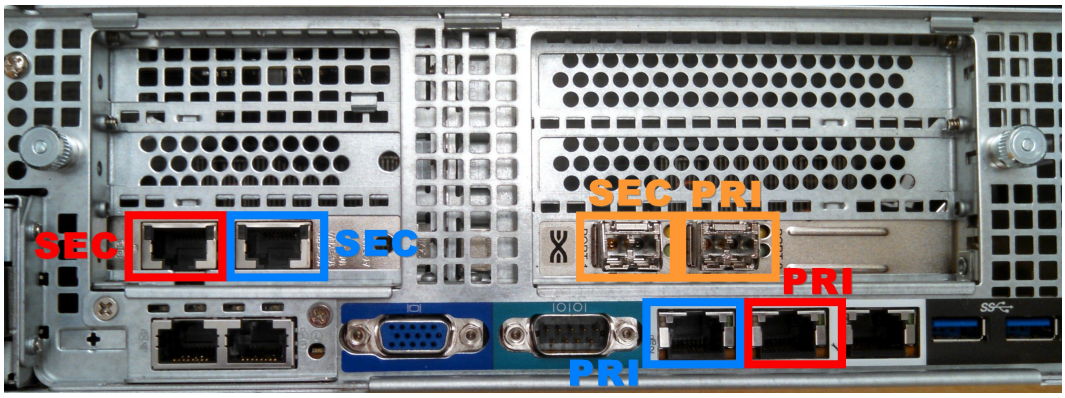
g. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.

Step 8g: HCP G10 Node Fibre port diagram

An HCP G10 Node with attached storage has a primary Fibre Channel port and a secondary Fibre Channel port. Both of the ports are located on the HBA card. Before connecting them to the switches, make sure an SFP transceiver is present in both the primary and secondary Fibre Channel ports on each node.

The picture below shows a G10 Node with four 10G Base-T ports for the front-end and back-end Ethernet ports and two Fibre Channel ports. The orange frames in the picture below indicate the Fibre Channel ports. The Fibre Channel ports are in the same location for any other attached storage network configuration.

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



If the ordered HCP system has no Fibre Channel switches, the HCP G10 Nodes are cabled directly to the storage arrays. If the ordered HCP system has Fibre Channel switches, the HCP G10 Nodes are cabled to the Fibre Channel switches. Follow the cabling instructions in the appropriate section below for the HCP system you are building.

Step 8h: Cabling HCP G10 Nodes to Fibre Channel switches

Follow the instructions outlined below to attach fiber optic jumper cables between the HCP G10 Nodes and the Fibre Channel switches. All of the HCP G10 Nodes in a given rack are connected to the Fibre Channel switches in the same rack. Each HCP rack contains two Fibre Channel switches. To connect the nodes to the switches:

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

2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

3. Attach one end of the fiber optic cable to a port on the Fibre Channel switch. Attach the other end of the cable to a port on one the HCP G10 Node according to the following list of port pairs. The pairs are defined as

the port on the switch (rack position-port) and port on the HCP G10 Node (node#-port).

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

4. Repeat steps 1 through 3 for each cable to be connected between the Fibre Channel switches and the HCP G10 Nodes. The number of cables is always an even number and all HCP G10 Nodes have two connections. Not all ports on the switches may be utilized and fewer than sixteen nodes may be present.

5. If there are more than sixteen nodes in the HCP system, proceed to the second rack and repeat the process in steps 1 through 4 for the next set of HCP G10 Nodes. For each Expansion rack in the system, add sixteen to the node count shown in the table.

6. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a

minimum bend radius of four inches (100mm) and are not crimped when organized as this will damage the fiber optic cable and render the path unusable.

Racking the Cisco MDS 9148S

Cisco MDS 9148S switches are Fibre Channel switches with 48 ports. 24 of the ports are active per switch. A pair of Cisco MDS 9148S switches can connect up to sixteen G10 Nodes and up to sixteen storage array ports.

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

Step 8a: Unpack the Cisco MDS 9148S

To unpack the Cisco MDS 9148S switch:

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

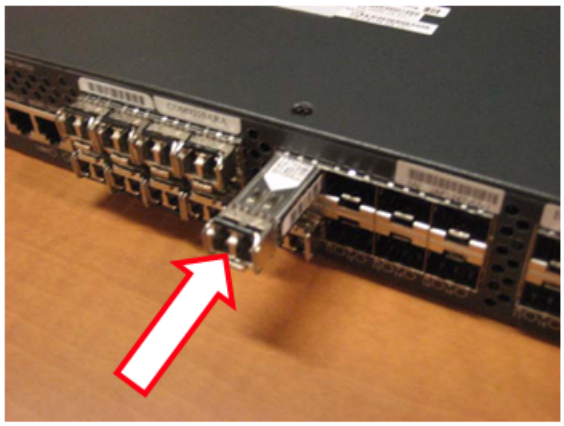
   The rest of items included in the switch container are not necessary for the installation. You do not need the original power cords for the switches.

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

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

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

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

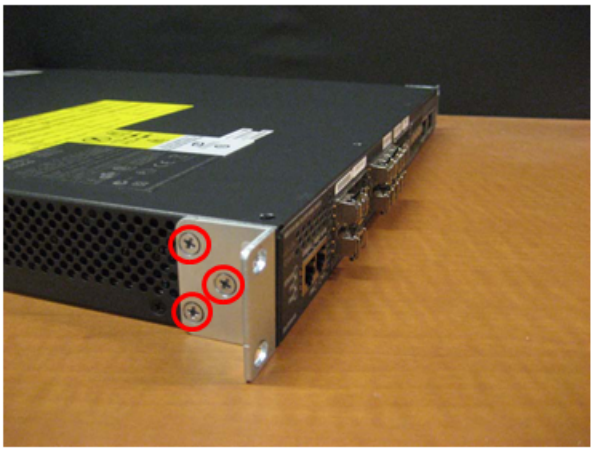


Important: It's important to be gentle when inserting the modules. The switches are fragile.

Step 8b: Install the Cisco MDS 9148S mounting rails

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

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



2. Attach the rear mounting bracket to the switch using M4 screws provided with the mounting kit.

3. On the front side of the rack, install three M5 caged nuts (from the rack accessory kit) in the top, middle, and bottom square holes of the left and right sides of U25 and U26.

4. On the rear side of the rack, install two M5 caged nuts (from the rack accessory kit) in the top and bottom square holes of the left and right sides of U25 and U26.

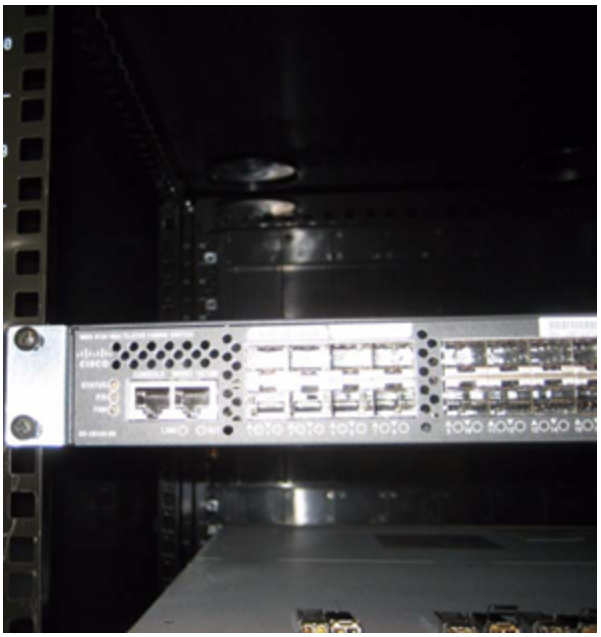
5. Connect the two long halves of the mounting rail kits to the front of the rack using two M5 screws per bracket as shown in the following image.

Step 8c: Mount the Cisco MDS 9148 into the rack

To mount the Cisco MDS 9148 switches in the rack:

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

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



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

Step 8d: Connect the Cisco MDS 9148S power cables to the PDUs

In order to connect power cords between the Cisco MDS 9148S and the installed PDUs the Fibre Channel switches in rack units U25 and U26 should be plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

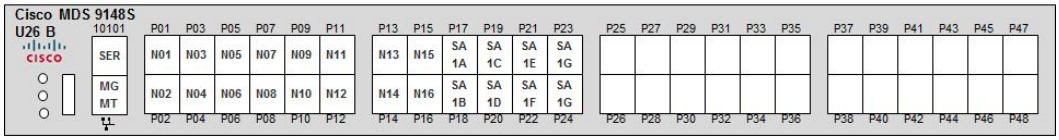
Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

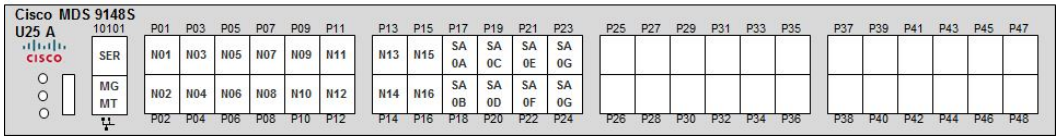
Step 8e: Cisco MDS 9148S port diagram

An HCP system with Fibre Channel switches includes the proper number of fiber optic jumper cables needed to connect the HCP G10 Nodes and the storage arrays to the Fibre Channel switches. The order includes labels to that need to be applied to the ends of the fiber optic cables to identify them for support purposes.

Dedicate one set of jumper cables to connecting the HCP G10 Nodes to the top Fibre Channel switch, labeled *B*. Dedicate the other set of jumper cables to connecting the HCP G10 Nodes to the bottom Fibre Channel switch, labeled *A*. A third set of jumper cables is used to connect the Fibre Channel switches to the storage arrays.

The diagrams below show the port layout for connecting the HCP G10 Nodes and storage arrays to the Cisco MDS 9148S Fibre Channel switches.





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

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

Fibre Channel ports 1-16 on the switches are reserved for connections to the HCP G10 nodes. Fibre Channel ports 17-24 on the switches are reserved for connections to the storage arrays.

All connections between the HCP G10 Nodes and the Fibre Channel switches have redundant paths for fault tolerance. All connections between the storage arrays and the Fibre Channel switches have redundant paths across controllers for fault tolerance.

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

Step 8f: Cabling a Fibre Channel switch to a storage array

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

1. If the HCP system being built is an Appliance configuration:

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

   b. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

   c. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the following list of port pairs. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information in the following table applies to HUS and VSP-G storage arrays. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

Primary	Secondary
C0-P0A to U25-P17	C1-P1A to U26-P17
C0-P0B to U25-P18	C1-P1B to U26-P18

(Continued)

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

d. Repeat steps 1a through 1c for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables you connect is always be an even number, but you may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.

e. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.

2. If the HCP system being built is a Base/Expansion configuration:

a. Based on the number of storage arrays attached to the system, determine which HCP G10 nodes will be attached to which storage array. Divide the number of HCP G10 nodes by the number of storage arrays. Since there are sixteen HCP G10 Nodes per HCP rack, determine the number of storage arrays that will be connected to the Fibre Channel switches in each HCP rack. If the number of nodes plus half of the number of storage array ports exceeds twenty-four, stop and contact HCP Product Management or HCP Engineering for further instructions on cabling for this order.

b. Select a fiber optic jumper cable of the appropriate length to reach from the Fibre Channel switches in the HCP rack and the storage controllers in the separate storage rack. Also, locate the label sheet containing pairs of numbered decals.

c. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the

second of the pair and attach it to the other end of the fiber optic cable.

d. Attach one end of the fiber optic cable to a port on the storage array. Attach the other end of the cable to a port on one the switches in rack position U25 or U26 according to the list of port pairs shown in step 1c above. The pairs are defined as the port on the storage array (controller-port) and port on the switch (rack position-port). The information presented in the following table applies to HUS and VSP-G storage arrays. If the storage array included on the order is not one of these types, substitute the appropriate ports on the storage array for the ones shown in the table.

e. Repeat steps 2b through 2d for each cable to be connected between the storage array and the Fibre Channel switches. The number of cables is always an even number, but may not use all of the ports defined above. See the HCP system configuration sheet uploaded with the order for more information.

f. If there is more than one array, repeat steps 2b through 2e for each storage array on the order.

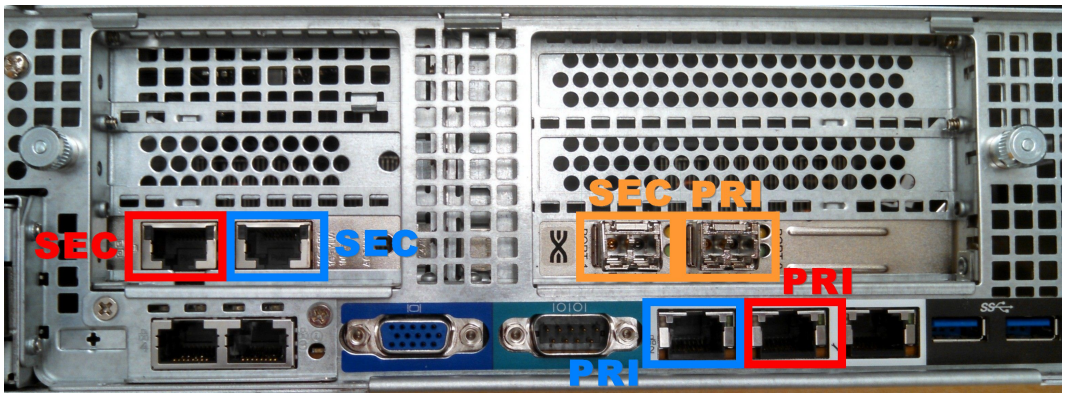
g. Neatly organize the fiber optic cables and use Velcro to attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this can damage the fiber optic cable.

Step 8g: HCP G10 Node Fibre port diagram

An HCP G10 Node with attached storage has a primary Fibre Channel port and a secondary Fibre Channel port. Both of the ports are located on the HBA card. Before connecting them to the switches, make sure an SFP transceiver is present in both the primary and secondary Fibre Channel ports on each node.

The picture below shows a G10 Node with four 10G Base-T ports for the front-end and back-end Ethernet ports and two Fibre Channel ports. The orange frames in the picture below indicate the Fibre Channel ports. The Fibre Channel ports are in the same location for any other attached storage network configuration.

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



If the ordered HCP system has no Fibre Channel switches, the HCP G10 Nodes are cabled directly to the storage arrays. If the ordered HCP system has Fibre Channel switches, the HCP G10 Nodes are cabled to the Fibre Channel switches. Follow the cabling instructions in the appropriate section below for the HCP system you are building.

Step 8h: Cabling HCP G10 Nodes to Fibre Channel switches

Follow the instructions outlined below to attach fiber optic jumper cables between the HCP G10 Nodes and the Fibre Channel switches. All of the HCP G10 Nodes in a given rack are connected to the Fibre Channel switches in the same rack. Each HCP rack contains two Fibre Channel switches. To connect the nodes to the switches:

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

2. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the fiber optic cable. Peel off the second of the pair and attach it to the other end of the fiber optic cable.

3. Attach one end of the fiber optic cable to a port on the Fibre Channel switch. Attach the other end of the cable to a port on one the HCP G10 Node according to the following list of port pairs. The pairs are defined as the port on the switch (rack position-port) and port on the HCP G10 Node (node#-port).

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

(Continued)

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

4. Repeat steps 1 through 3 for each cable to be connected between the Fibre Channel switches and the HCP G10 Nodes. The number of cables is always an even number and all HCP G10 Nodes have two connections. Not all ports on the switches may be utilized and fewer than sixteen nodes may be present.

5. If there are more than sixteen nodes in the HCP system, proceed to the second rack and repeat the process in steps 1 through 4 for the next set of HCP G10 Nodes. For each Expansion rack in the system, add sixteen to the node count shown in the table.

6. Neatly organize the fiber optic cables and use Velcro to neatly attach them to the cable organizer in the rack. Make sure the cables meet a minimum bend radius of four inches (100mm) and are not crimped when organized as this will damage the fiber optic cable and render the path unusable.

Step 9: Rack the Ethernet Switches

The Ethernet switches described in this step are all back-end switches. The port side of the switches should be facing the rear of the racks when installed. 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 which can be ordered with an HCP system. Please choose the switch ordered from the following table and proceed to that section for racking, cabling, and configuration instructions.

Switch Type	Installation, cabling, and configuration instructions
Brocade ICX6430 (1G)	"Racking the Brocade ICX 6430" below
HP 4208VL (1G)	"Racking the HP ProCurve 4208LV" on page 85
Brocade VDX6740 (10G)	"Racking the Brocade VDX 6740" on page 92
Cisco Nexus 5548UP (10G)	"Racking the Cisco Nexus 5548UP" on page 102
Cisco Nexus 5596UP (10G)	"Racking the Cisco Nexus 5596UP" on page 113

Racking the Brocade ICX 6430

Brocade ICX 6430 switches are 1G Ethernet switches with 24 ports per switch. A pair of Brocade ICX 6430 switches can connect up to 22 G10 Nodes. 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

Step 9a: Unpack the Brocade ICX 6430

To unpack the Brocade ICX 6430 switch:

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

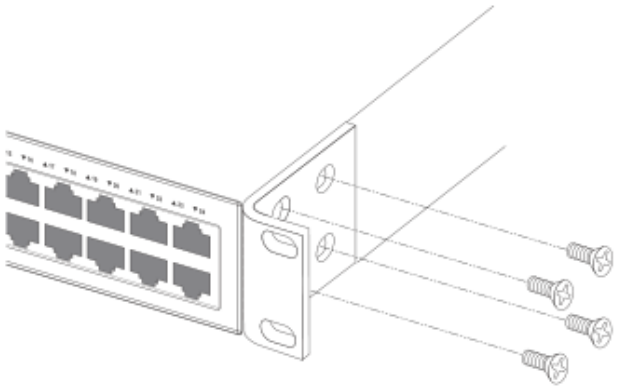
    The rest of items included in the switch container are not necessary for installation. You don't need the original power cords for the switches.

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

Step 9b: Mount the Brocade ICX 6430 in the rack

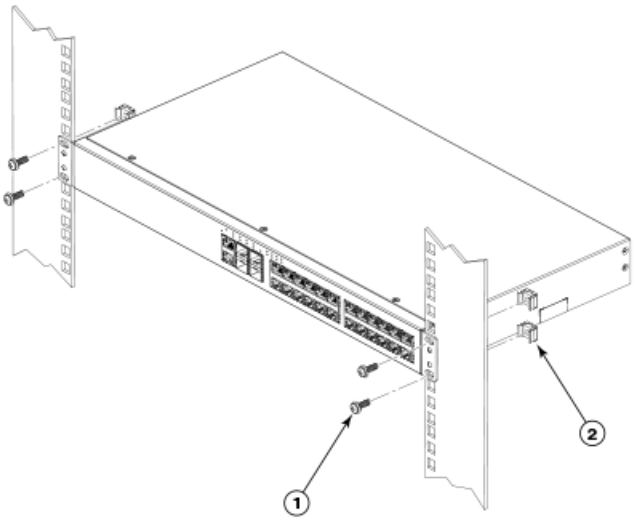
To mount the Brocade ICX 6430 switches into the rack:

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



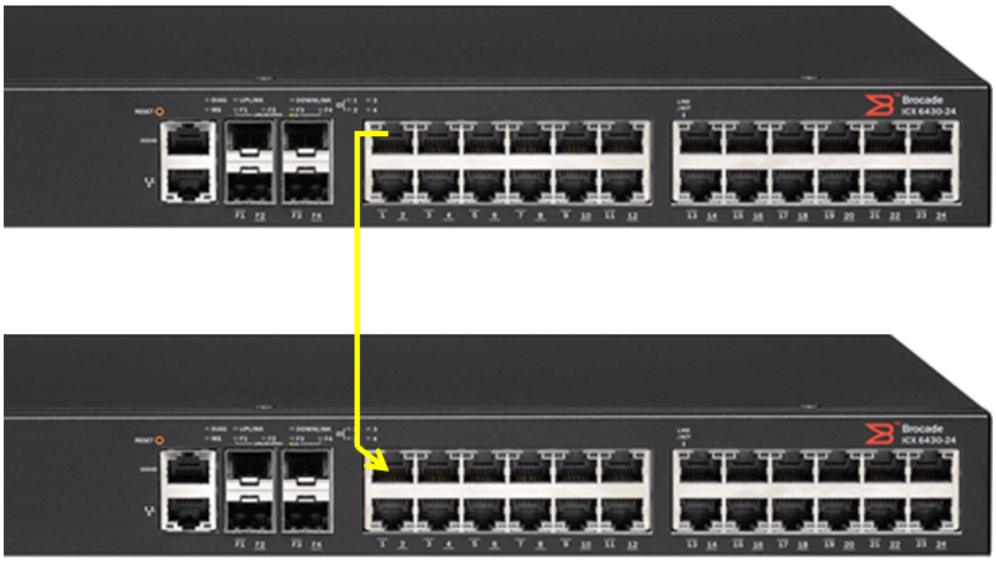
2. Insert four cage nuts in the top and bottom square holes on the left and right sides of the rear of the rack in position U27.

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. Connect the switches together with a purple one foot (300mm) Ethernet cable. Plug the cable into port 01 of both switches.



6. Neatly loop the cable between the switches if possible.

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

Step 9c: Connect the Brocade ICX 6430 power cables to the PDUs

The Brocade ICX 6430 Ethernet switches in rack units U25 and U26 each have one power connection. The switch in position U25 should be plugged into an outlet in the bottom half of the upper left zero U mounted PDU. The switch in position U26 should be plugged into an outlet in the bottom half of the upper right zero U mounted PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

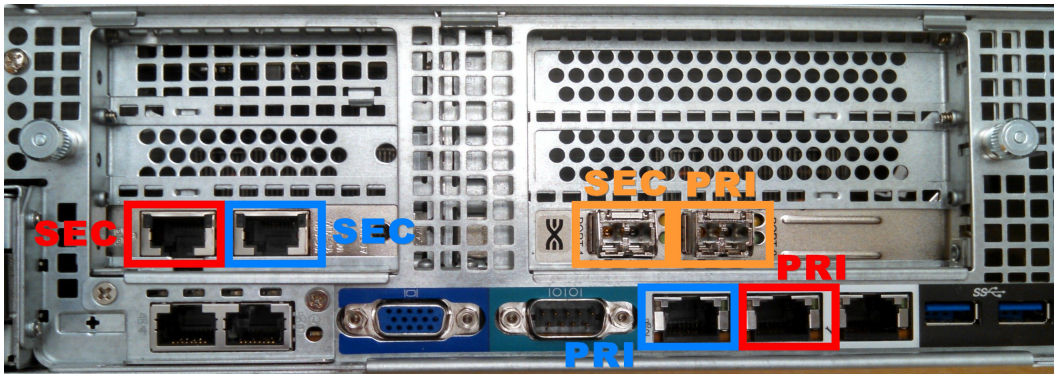
Step 9d: HCP G10 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430 or HP 4208VL), the HCP G10 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 G10 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches.

PRI denotes primary ports, 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. SEC denotes secondary ports, 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 G10 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to either the Brocade ICX 6430 or HP 4208VL switches.



The following image shows an HCP G10 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.

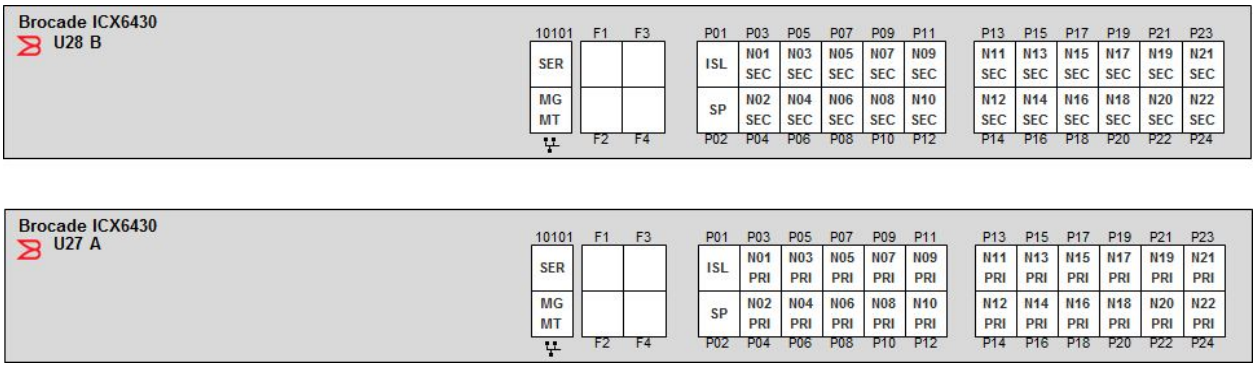
Step 9e: Brocade ICX 6430 port diagram

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 harnesses 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 have four ports reserved for functions outside of communicating with the nodes. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

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



Step 9f: Connect the Brocade ICX 6430 Ethernet cables

To connect the Ethernet cables to their respective ports:

1. Locate one red and one blue Ethernet cable harness. The first two CAT-6 cable harnesses are 7 feet in length. If there is a third set of cable harnesses, the harnesses are 25 feet in length and are used for nodes 17 through 22.

2. Connect the short end of the red cable harness cables to the Brocade ICX 6430 switch in rack position U27. Connect cables 01 through 08 to the proper ports on the switch corresponding to node numbers 1 through 8.

3. Connect the short end of the blue cable harness cables to the Brocade ICX 6430 switch in rack position U28. Connect cables 01 through 08 to the proper ports on the switch corresponding to node numbers 1 through 8.

4. Tie off the short end of the remaining red and blue cables (cables 09-12 and EXTRA) neatly.

5. Connect the long end of the red cable harness cables to the HCP G10 Nodes 1 through 8 using the back-end network port marked PRI. Not all of the cables are used if the number of nodes is less than eight.

6. Connect the long end of the blue cable harness cables to the HCP G10 Nodes 1 through 8 using the back-end network port marked SEC. Not all of the cables are used if the number of nodes is less than eight.

7. Tie off the long end of the remaining red and blue cables (cables 09-12, EXTRA, and any other unused cables) neatly.

8. Attach the cable harnesses to the cable management trays at the rear of the rack on the left or right side of the rack.

9. If there are more than eight nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by eight.

10. If there are more than sixteen nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by sixteen.

Racking the HP ProCurve 4208LV

The HP ProCurve 4208LV switches are 1G Ethernet switches with up to 192 ports on each switch. The switches connect to a maximum of 80 HCP G10 Nodes. The 1G back-end switch is used in HCP systems with more than 22 G10 Nodes or 1G HCP systems where the number of nodes is expected to grow beyond 22 nodes.

The HP ProCurve 4208LV switch comes with one chassis and, depending on number of nodes on the order, multiple 24 port extended port modules. The chassis is mounted in rack unit 37 and takes the space of 5 racking units.

Items you need to rack the Ethernet switches include:

- A #2 Phillips screwdriver
- A Caged-nut insertion and removal tool

Step 9a: Unpack the HP ProCurve 4208VL

To unpack the HP ProCurve 4208VL switch:

1. Locate the following items in the switch container:
    - 2 switch mounting brackets
    - 6 small black screws for switch mounting brackets
2. Locate the 2U Universal rail kit, and the 8 cage nuts and 8 screws that come with it.
3. Supply the following items:
    - 8 M5 cage nuts
    - 8 M5 screws

4. Locate any additional 24 port switch expansion modules
5. Set the required items aside in an easy-to-reach location.
6. Leave the unused items in the switch container, and set the container aside.

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

   Do not discard additional items. Pack them together and set them aside.
7. If the HP 4208VL switch requires the installation of port expansion modules, follow the remaining steps below, otherwise, skip forward to the mounting of the switch in the rack.
8. Unscrew and remove the blank panel covering up slots C and D (or E and F, or G and H) on the HP ProCurve 4208VL switch.
9. Insert the two 24-port expansion modules into the vacant slots as shown in the following image.

10. Using a screwdriver, screw the two new expansion modules into place.
11. Repeat steps 7 through 9 for each remaining pair of port expansion modules.

Step 9b: Install the HP ProCurve 4208 VL rails

To install the two mounting brackets:

1. Align a bracket with the front of the switch (the side with no port).

2. Secure the two brackets to the sides of the switch using three of the provided mounting screws for each bracket as shown in the image below.

3. Install the caged nuts from the 2U universal rail kit in the top of U38 and bottom of U37 on both the right and left, front and rear of the rack.

4. Install two additional caged nuts from the rack accessory kit in the front left and right of the rack in bottom of U39 and the top of U37.

5. Install the left and right 2U universal rail kit brackets and secure them with the screws from the 2U universal mounting rail kit as shown in the following image. The brackets in the image shown are an older model, but the current brackets function the same way.

6. On the front of the rack, install a 3U blanking panel using four screws from the rack accessory kit. The perforated blanking plate shown in the image above is an older model, but the current perforated blanking plate function the same way.

Step 9c: Mount the HP ProCurve 4208VL in the rack

To install the HP ProCurve Ethernet switch in the rack:

1. From the rear of the rack, set the switch onto the 2U universal rail kit installed in the previous step.

2. Push the switch into the rack on the universal rails until it's fully pushed in. The front of the switch should be flush with the rear of the rack.

3. Using the four M5 screws, secure the mounting brackets to the rear of the rack in the following locations:

- Top square cage nut in rack unit 37 (both sides)

- Bottom square cage nut in rack unit 39.

Step 9d: Connect the HP ProCurve 4208 VL power cables to the PDUs

The HP 4208VL Ethernet switch in rack unit U37 should be plugged into outlets in the upper half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

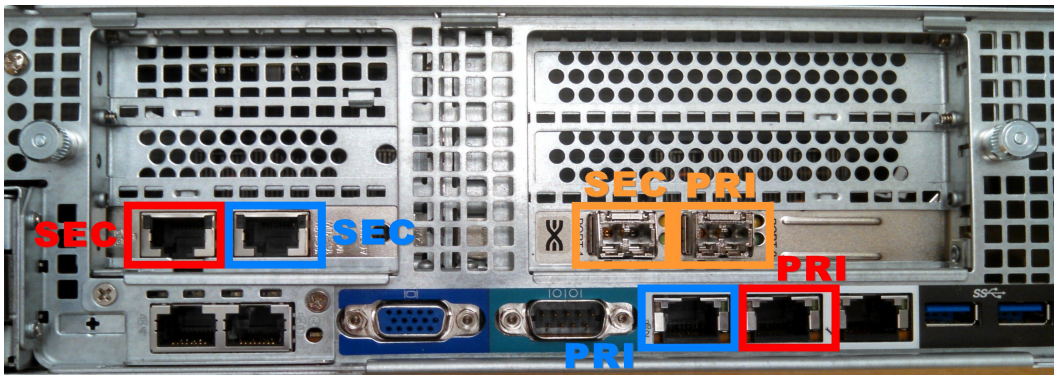
Step 9e: HCP G10 Node 1 GB port diagram

For HCP systems with 1G back-end switches (Brocade ICX 6430 or HP 4208VL), the HCP G10 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 G10 Node with attached storage.

In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches.

PRI denotes primary ports, 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. SEC denotes secondary ports, 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 G10 Node with 10G BASE-T ports for both front-end and back-end connections. The 10G ports used for the back-end Ethernet networking run at 1G when connected to either the Brocade ICX 6430 or HP 4208VL switches.



The following image shows an HCP G10 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.

Step 9f: HP ProCurve 4208VL port diagram

An HCP system comes with all the CAT-6 cable harnesses needed to support the ordered number of nodes. There are multiple red and multiple blue Ethernet cable harnesses that come with the HCP system when the HP 4208VL switch is included. In order to connect the cables to the HP 4208VL back-end network switch, follow the instructions below.

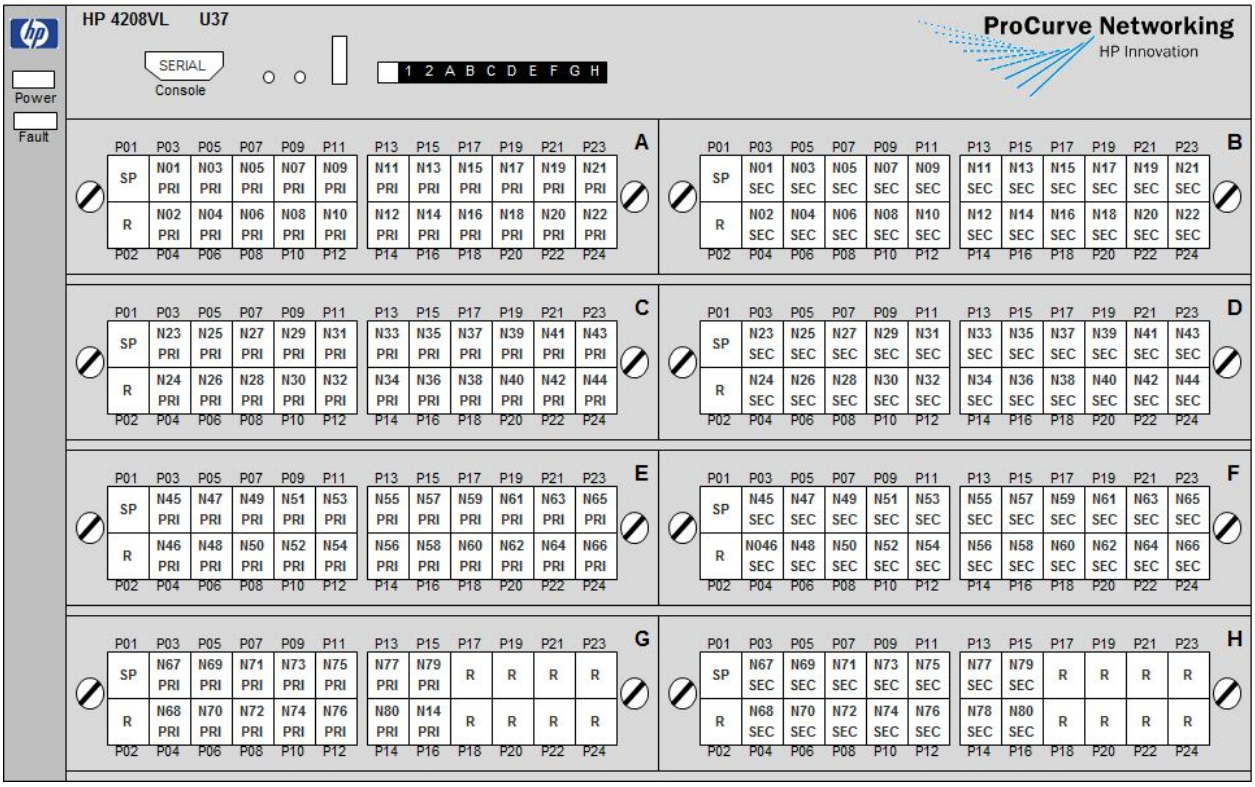
Primary HCP G10 Node ports connect to ports on the left side modules of the switch. Secondary HCP G10 Node ports connect to ports on the right side modules of the switch. Each new rack you add to the HCP system requires two additional 24-port modules to be installed in the switch, one

for each side of the switch. There are no red and blue Ethernet cable harnesses included with the HCP G10 Nodes in the Expansion racks to the HP 4208VL switch in the Base rack.

When connecting with nodes in another rack, the harnesses can be routed over the tops of the racks or under the floor depending on your system environment.

The diagram below shows two ports per port module reserved for functions outside of communicating with the nodes. Do not plug Ethernet cables into these ports during this step. The ports are labeled:

- **SP** — a service port used by HDS service personnel.
- **R** — a reserved port.



Step 9g: Connect the HP ProCurve 5208VL Ethernet cables

In order to connect the cables:

1. 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.

2. Connect the short end of the red cable harness cables to the HP4208VL 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.

3. Connect the short end of the blue cable harness cables to the HP 4208VL 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.

4. Tie off the short end of the remaining red and blue cables (cables 09-12 and EXTRA) neatly.

5. Connect the long end of the red cable harness cables to the HCP G10 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.

6. Connect the long end of the blue cable harness cables to the HCP G10 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.

7. Tie off the long end of the remaining red and blue cables (cables 09-12, EXTRA, and any other unused cables) neatly.

8. Attach the cable harnesses to the cable management trays at the rear of the rack on the left or right side of the rack.

9. If there are more than eight nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by eight.

10. If there are more than sixteen nodes in the HCP system, repeat steps 1 through 8, incrementing the node numbers by sixteen.

Racking the Brocade VDX 6740

Brocade VDX 6740 switches are 10G Ethernet switches with 48 ports per switch. A pair of Brocade VDX 6740 switches can connect up to 44 G10 Nodes. Each switch takes up one rack unit. The switches are mounted in rack positions U27 and U28.

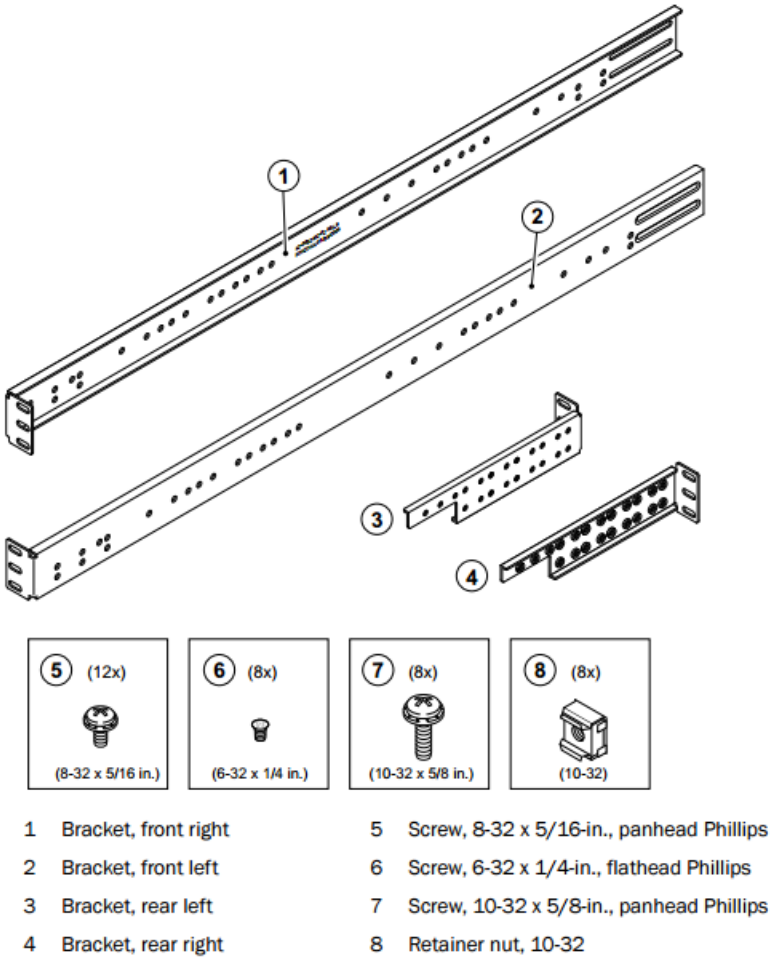
Items you will need to rack the Ethernet switches include:

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

Step 9a: Unpack the Brocade VDX 6740

To unpack the Brocade VDX 6740 switch:

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



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

3. Supply the following items (per switch):
   - Eight M5 caged nuts
   - Eight M5 screws
4. Locate a single 10G SFP+ to 1G RJ-45 adapter module, Brocade part number XBR-000190.P.
5. Set the required items aside in an easy-to-reach location.
6. Leave the unused items in the switch container, and set the container aside.

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

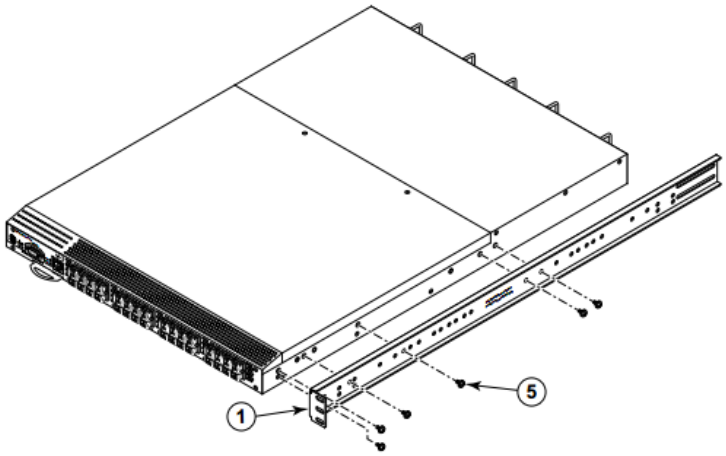
Do not discard additional items. Pack them together and set them aside.

7. Place the 10G SFP+ to 1G RJ-45 adapter module into port 03 of one of the two switches.

Step 9b: Install the Brocade VDX 6740 rails

To install Brocade VDX 6740 rails:

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



1 Bracket, front right

5 Screw, 8-32 x 5/16-in., panhead Phillips

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

3. Repeat the previous steps to attach the front left bracket to the left side of the switch.

4. Tighten all of the 8-32 x 5/16-inch screws to a torque of 15 in-lbs. (17 cm-kgs).

Step 9c: Mount the Brocade VDX 6740 in the rack

To mount the Brocade VDX 6740 in the rack:

1. Set the M5 cage 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 cage 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.

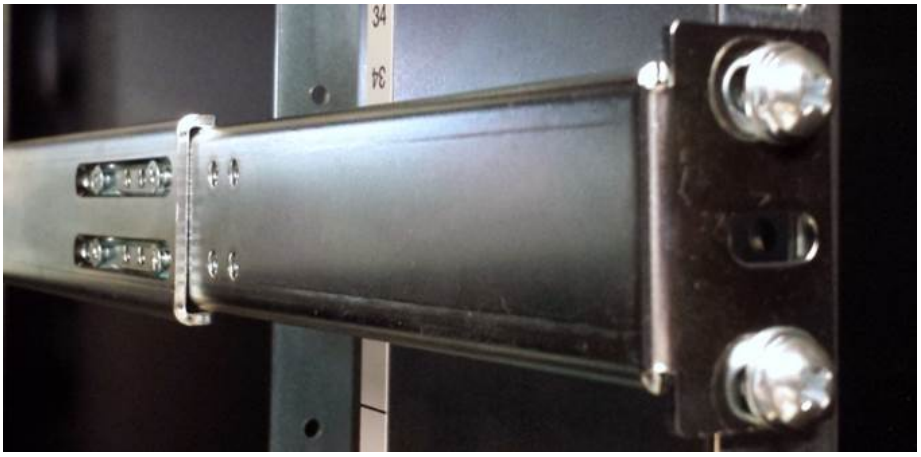
3. Position the switch in the rear cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.

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.

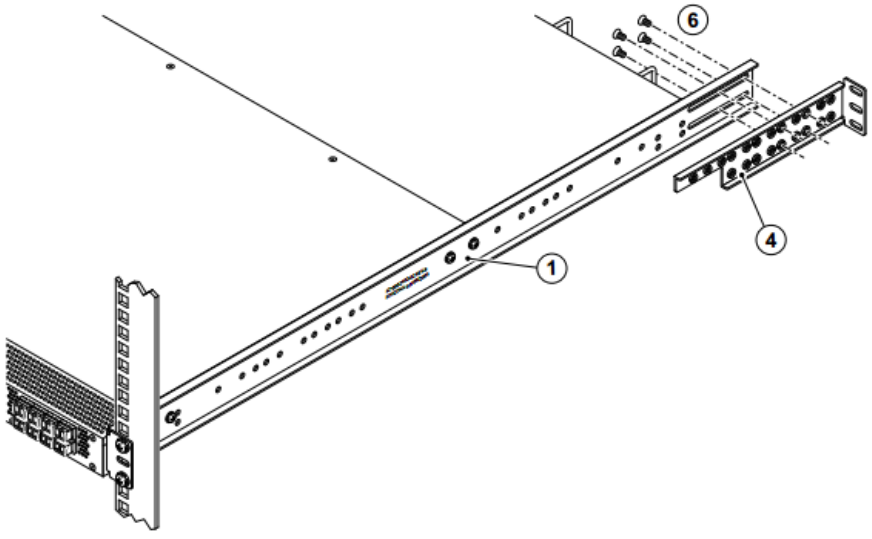
5. Once the four rear screws have been secured, you should be able move to the front of the cabinet to secure the rear of the rails. Position the

right rear bracket inside the right front bracket and install two rack screws to hold it to the front of the rack. Repeat the process for the left rear bracket.

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



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.

8. Locate the two one meter long Twinax cables used to interconnect the switches.

9. Connect one end of the first one meter Twinax cable to port 01 on the switch mounted in rack position U28. Connect the other end of the first one meter Twinax cable to port 01 on the switch mounted in rack position U27.

10. Connect one end of the second one meter Twinax cable to port 02 on the switch mounted in rack position U28. Connect the other end of the second one meter Twinax cable to port 02 on the switch mounted in rack position U27.

11. Tie off the two one meter cables to the cable management trays at the rear of the rack.

Step 9d: Connect the Brocade VDX 6740 power cables to the PDUs

The Brocade VDX6740 Ethernet switches in rack units U27 and U28 should be plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

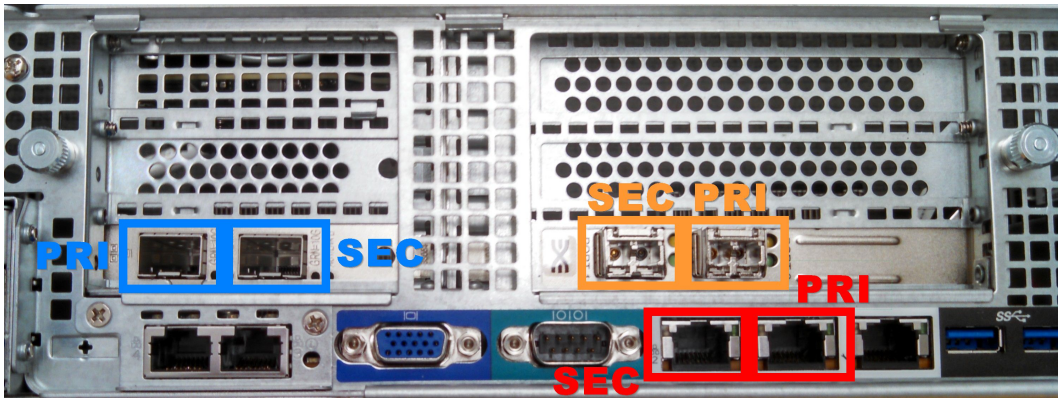
Step 9e: HCP G10 Node 10G port diagrams

For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G10 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures below show all of the possible ways to configure Ethernet ports on a HCP G10 Node with attached storage.

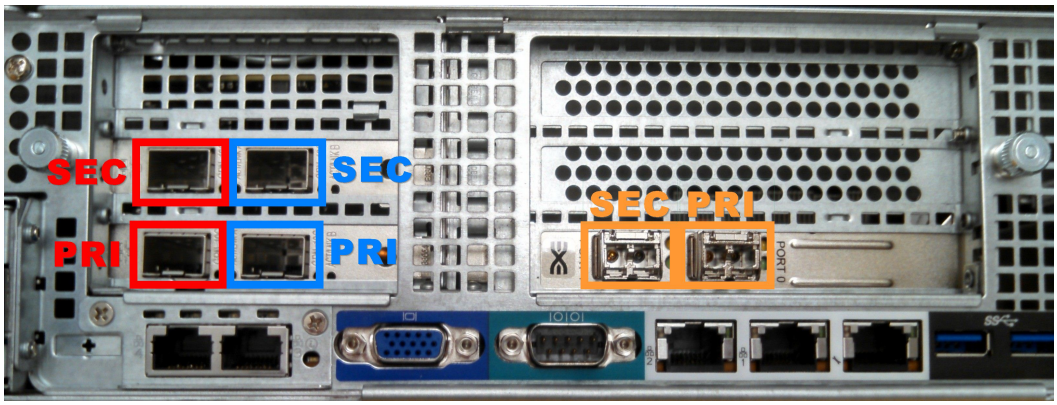
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches.

PRI denotes primary ports, 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. SEC denotes secondary ports, 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 G10 Node with 10G SFP+ ports for back-end network connections.



The following image shows an HCP G10 Node with 10G SFP+ ports for both front-end and back-end connections.



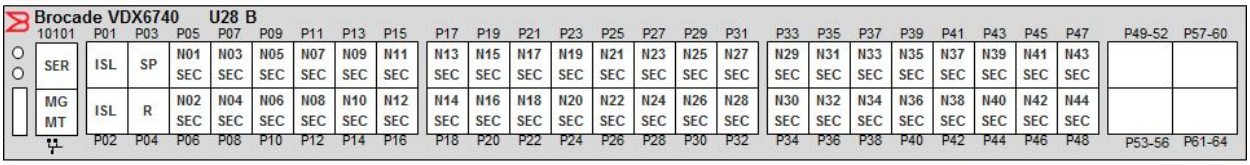
Step 9f: Brocade VDX 6740 port diagram

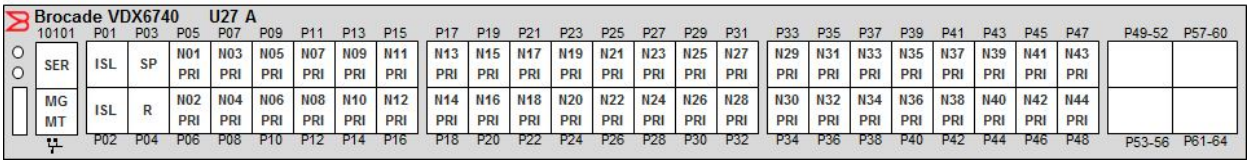
An HCP system comes with all the Twinax cables needed to connect the ordered number of nodes to the switches. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax 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 G10 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 HDS service personnel.
- **R** — the port is reserved.





Step 9g: Connect the Brocade VDX 6740 Ethernet cables

To connect the cables to the ports:

1. Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the Brocade VDX 6740 switches in the Base or Appliance rack to the HCP G10 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.

2. Locate the label sheets containing pairs of numbered decals.

3. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

4. Connect one end of the Twinax cable to the Brocade VDX 6740 switch in rack position U27 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.

5. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

6. Connect one end of the Twinax cable to the Brocade VDX 6740 switch in rack position U28 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.

7. Repeat steps 3 through 6 for each of the nodes in the Appliance or Base rack.

8. Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.

9. 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

Cisco Nexus 5548UP switches are 10G Ethernet switches with 32 ports per switch. The switches can be expanded to 48 ports per switch using a pair of sixteen port expansion modules. A pair of Cisco Nexus 5548UP switches can connect up to 44 G10 Nodes. 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

Step 9a: Unpack the Cisco Nexus 5548

To unpack the Cisco Nexus 5548 switch:

1. 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
2. Supply the following items (per switch):
    - Eight M5 screws
    - Eight M5 caged nuts

3. Locate a single 10G SFP+ to 1G RJ-45 adapter module, Cisco part number GLC-T=.P.

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

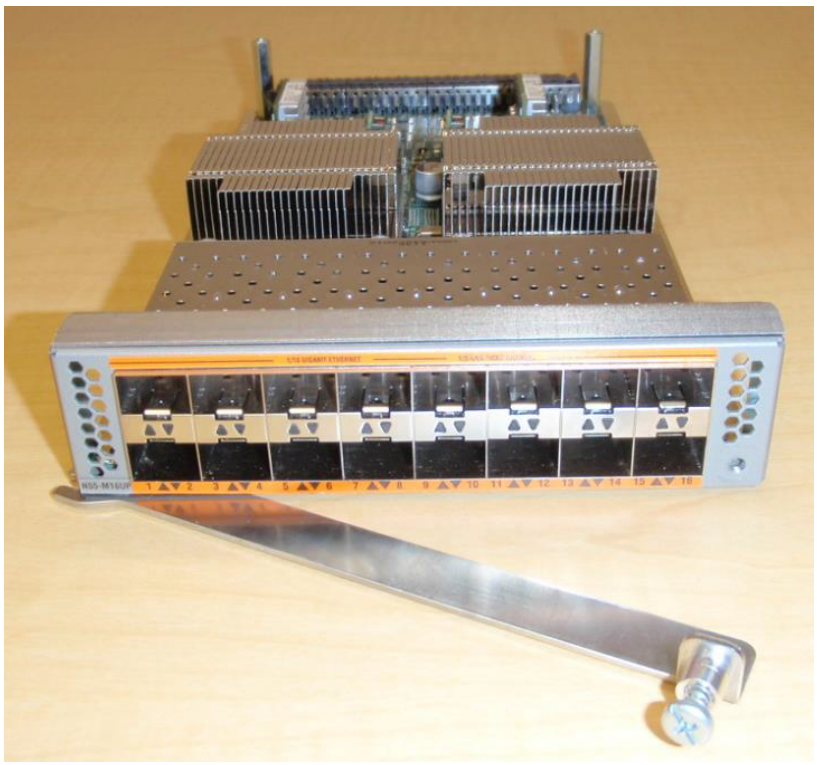
5. Leave the unused items in the switch container, and set the container aside.

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

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

6. If the system is ordered with more than 28 nodes, the switches arrive with sixteen port expansion modules. Optionally, to install the expansion modules in both switches:

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



   b. Unscrew the dummy plate from the front of the Cisco Nexus 5548UP 10G Ethernet switch with a Philips screwdriver.

   c. Release the dummy plate locking lever.

d. Carefully install the Port Expansion module by aligning the module in the switch and locking the lever into place.

e. Screw the module in place using the screw attached to the lever. Do not over-tighten.

f. Repeat steps a through e for the sixteen port expansion module in the second Cisco Nexus 5548UP switch.

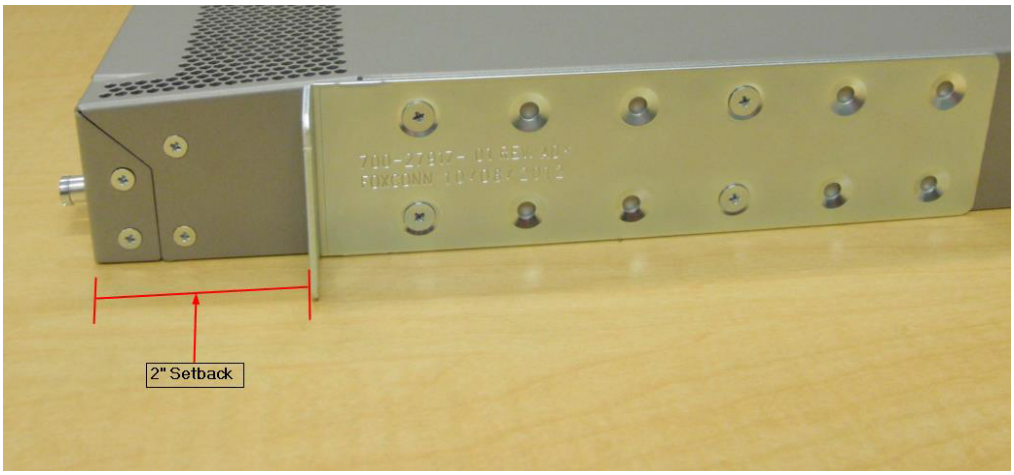
7. Place the 10G SFP+ to 1G RJ-45 adapter module into port 03 of one of the two switches.

Step 9b: Install the Cisco Nexus 5548UP rails

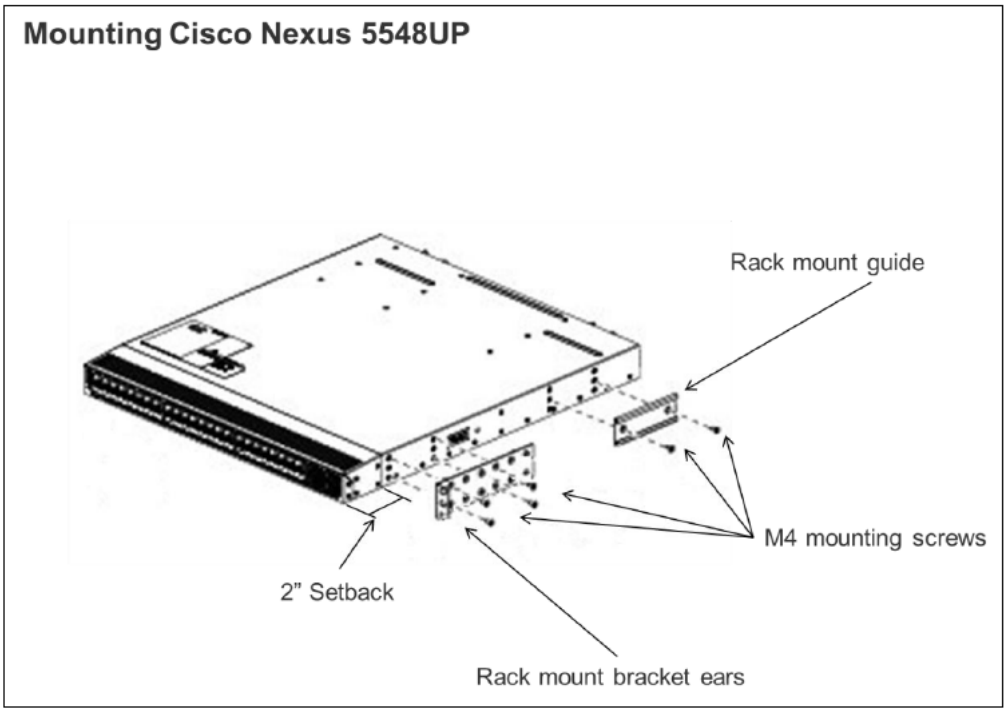
The following image shows the M4 screws, mounting rails, mounting rail guides, and mounting ears.

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

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

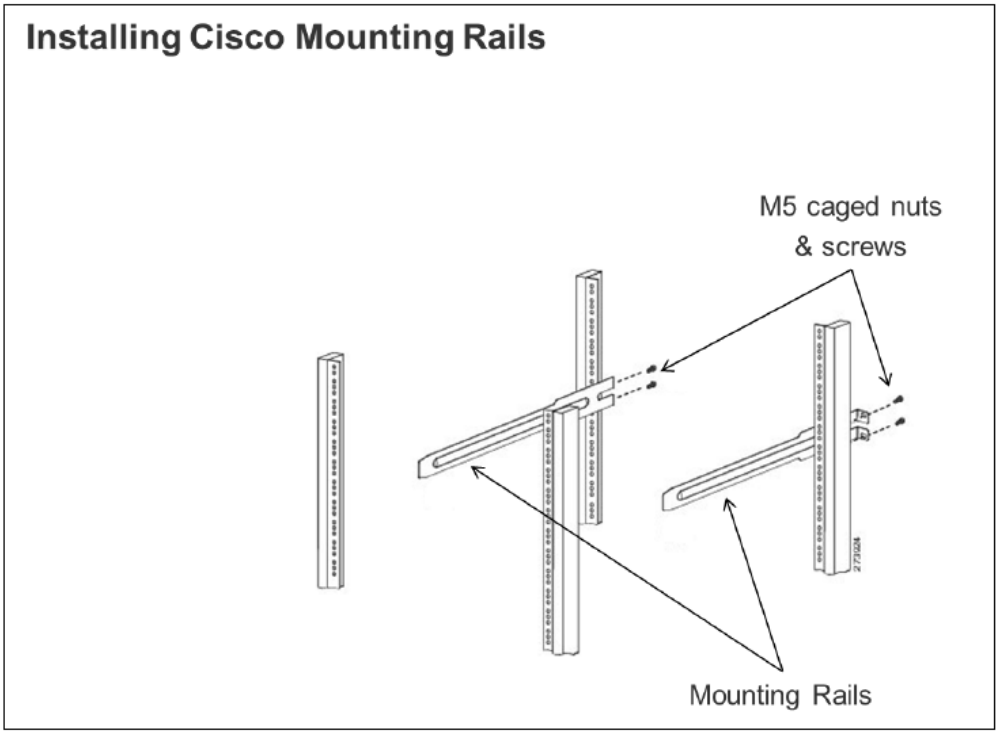


3. Install the rear mounting bracket to the rear of the switch with two M4 mounting screws as shown below.



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

5. Install M5 cage 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.

Step 9c: Mount the Cisco Nexus 5548 in the rack

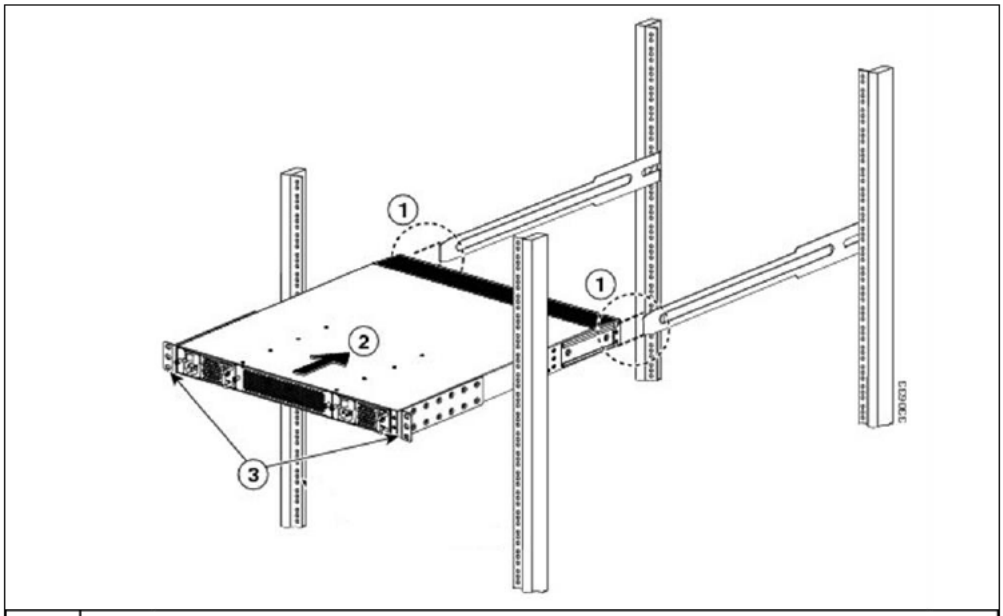
To install the Cisco Nexus 5548UP switches in the rack:

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.



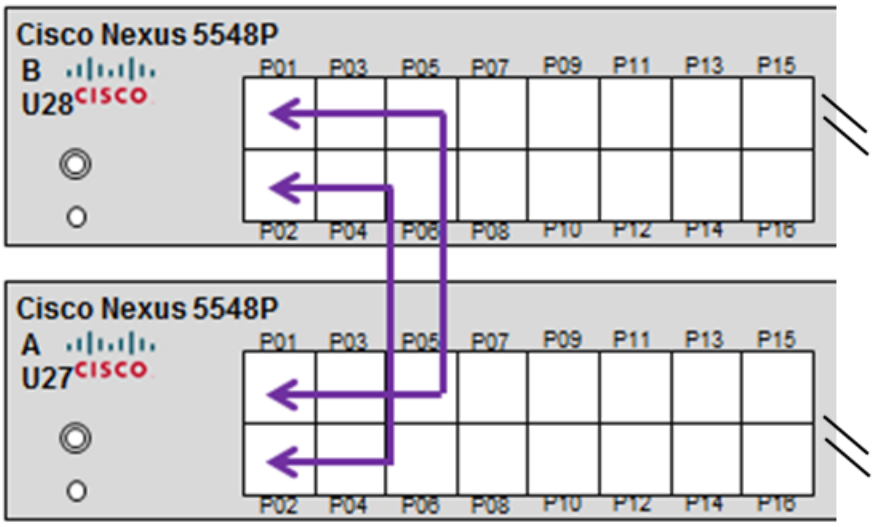
1	Align the two rear rack-mount guides with the slider rails installed in the rack.
2	Slide the rack-mount guides onto the slider rails until the front rack-mount brackets come in contact with the front rack-mount rails.
3	Mount switch using four M5 screws with plastic washers per switch.

4. Repeat steps 2 and 3 for the second switch. Install itin rack position U28.

5. Locate two one meter Twinax cables.

6. Plug one end of the first one meter Twinax cables into port 01 switch in rack position U28, and plug the other end into port 01 of the switch in rack position U27.

7. Plug one end of the second one meter Twinax cables into port 02 switch in rack position U28, and plug the other end into port 02 of the switch in rack position U27.



8. 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 over-tighten the screws to compensate.

Step 9d: Connect the Cisco Nexus 5548UP power cables to the PDUs

To connect power cords between the Cisco Nexus 5548UP and the installed PDUs the Ethernet switches in rack units U27 and U28 should be plugged into outlets in the bottom half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the lower half circuit breaker.

Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

Step 9e: HCP G10 Node 10G port diagrams

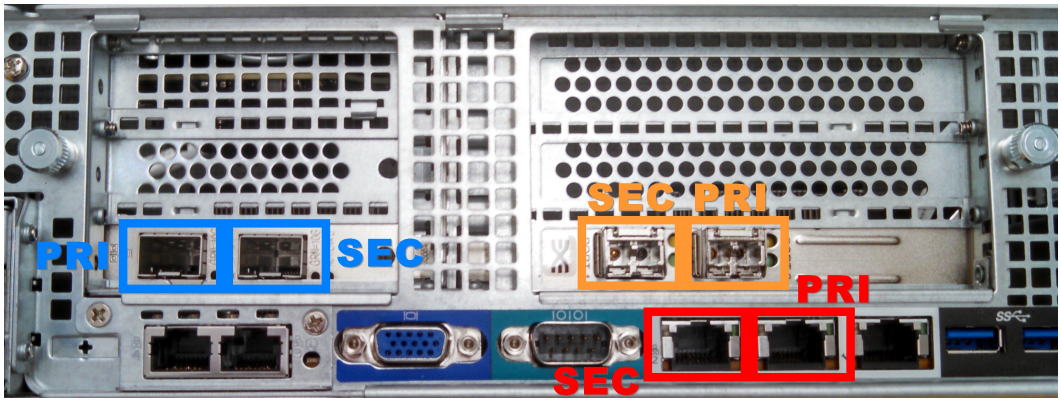
For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G10 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures

below show all of the possible ways to configure Ethernet ports on a HCP G10 Node with attached storage.

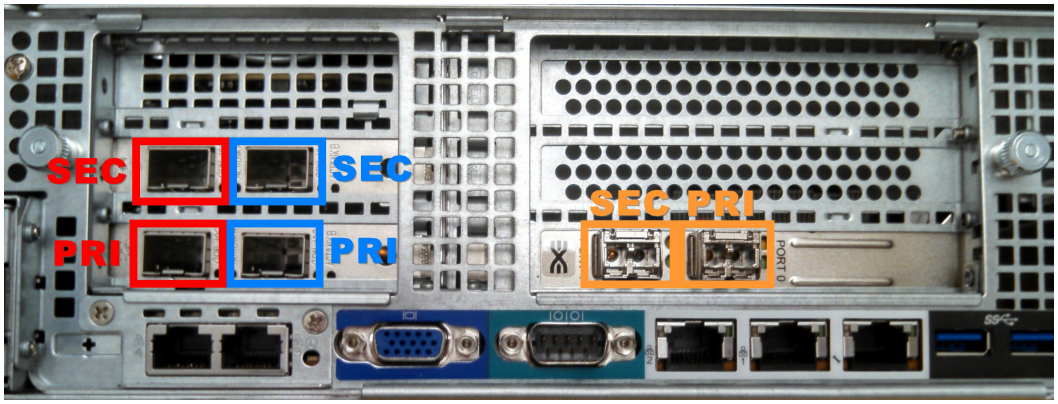
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches.

PRI denotes primary ports, 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. SEC denotes secondary ports, 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 G10 Node with 10G SFP+ ports for back-end network connections.



The following image shows an HCP G10 Node with 10G SFP+ ports for both front-end and back-end connections.



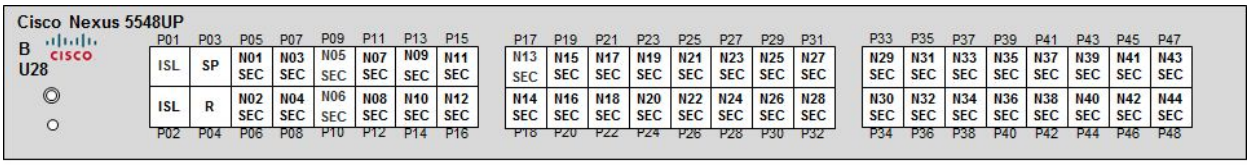
Step 9f: Cisco Nexus 5548UP port diagram

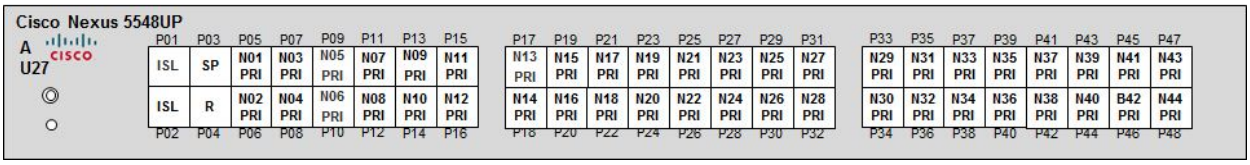
An HCP system comes with all the Twinax cables needed to support the ordered number of nodes. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax cables.

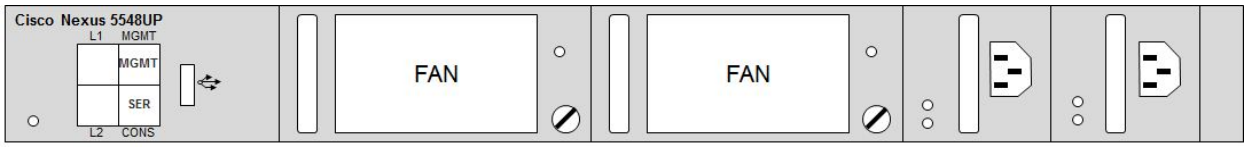
Note: Twinax cables from Brocade and Cisco are not compatible with one another. Please ensure you only use the vendor specific cables with the switches.

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







Step 9g: Connect the Cisco Nexus 5548UP Ethernet cables

To connect the cables:

1. Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the Cisco Nexus 5548UP switches in the Base or Appliance rack to the HCP G10 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.

2. Locate the label sheets containing pairs of numbered decals.

3. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

4. Connect one end of the Twinax cable to the Cisco Nexus 5548UP switch in rack position U27 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.

5. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

6. Connect one end of the Twinax cable to the Cisco Nexus 5548UP switch in rack position U28 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.

7. Repeat steps 3 through 6 for each of the nodes in the Appliance or Base rack.

8. Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.

9. 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 G10 Nodes. Each switch takes up two rack units. They switches are mounted in rack positions U37 and U39.

The items you need to rack the Ethernet switches include:

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

Step 9a: Unpack the Cisco Nexus 5596UP

To unpack the Cisco Nexus 5596 switch:

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

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

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

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

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

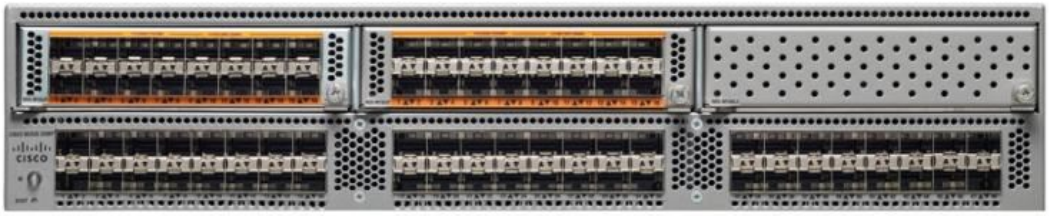
   b. Unscrew the dummy plate from the front of the Cisco Nexus 5596UP 10G Ethernet switch with a Philips screwdriver.

   c. Release the dummy plate locking lever. The image shows a Cisco Nexus 5548 switch for example purposes.

d. Carefully install the Port Expansion module by aligning the module in the switch and lock the lever into place.

e. Screw the module in place using the screw attached to the lever. Do not over-tighten. The image shows a Cisco Nexus 5548 switch for example purposes.

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



7. Place the 10G SFP+ to 1G RJ-45 adapter module into port 03 of one of the two switches.

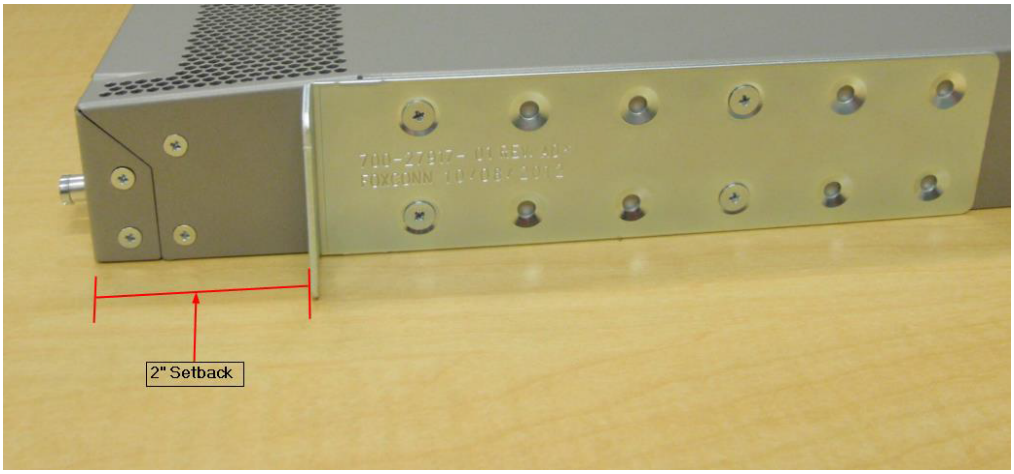
Step 9b: Install the Cisco Nexus 5596UP rails

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

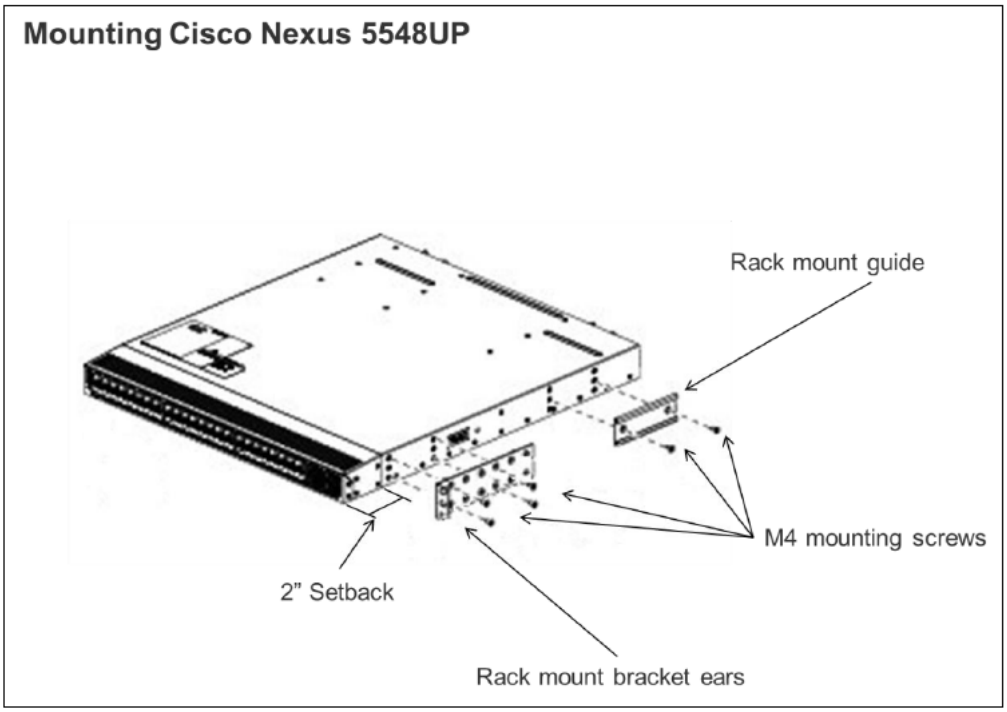
1. Orient the brackets with the mounting ears to the port side of the switch.

2. Attach the ears to the sides of the switch with four M4 screws per bracket so that the face of the switch is mounted with a 2 inch setback

as shown in the image below. This way the switch extends 2 inches past the rear EIA rails. The switch shown in the image is a Cisco Nexus 5548UP, but the mounting of the bracket is almost identical.



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

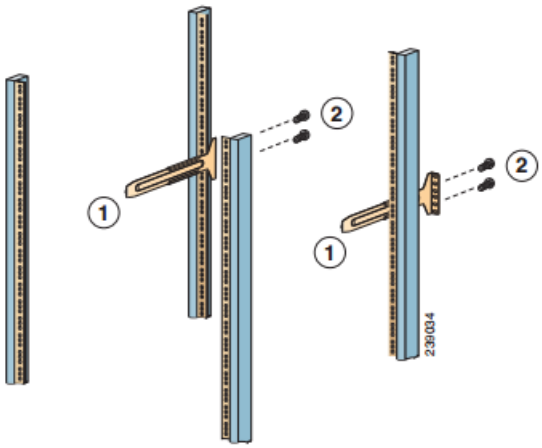


4. Repeat steps 1 through 3 for the other side of the switch and the other Cisco Nexus 5596UP 10G Ethernet switch.

5. Install M5 cage nuts in the front of the rack in the bottom and middle square holes of rack positions U37 and U39 and the middle and top square holes of rack positions U38 and U40 on both the left and right side of the rack.

6. Attach the first set of slide rails to the front of the rack in positions U37 and U38 using M5 screws.

7. Attach the second set of slide rails to the front of the rack in positions U39 and U40 using M5 screws.



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

Step 9c: Mount the Cisco Nexus 5596UP in the rack

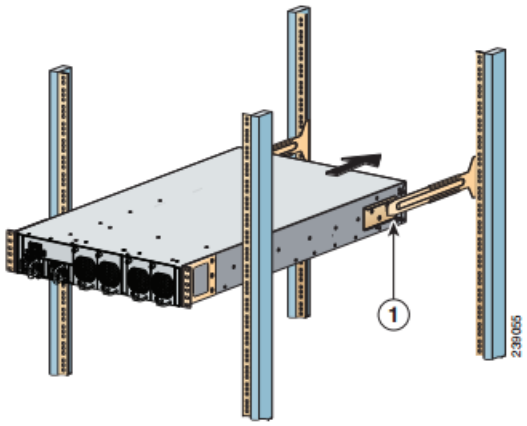
To install the Cisco Nexus 5596UP switches in the rack:

1. Install M5 caged nuts in the rear of the rack in the bottom square holes of rack positions U37 and U39 and the top square hole of rack positions U38 and U40 on both the left and right side of the rack.

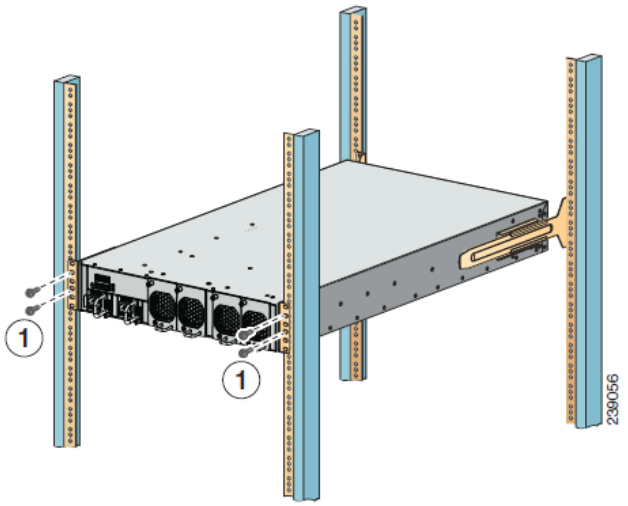
2. Slide the first switch into place in U37, taking care to align the rear mounting bracket on the switch with the mounting rails attached to the front of the rack.

3. Secure the switch to the rack using four M5 screws.

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



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

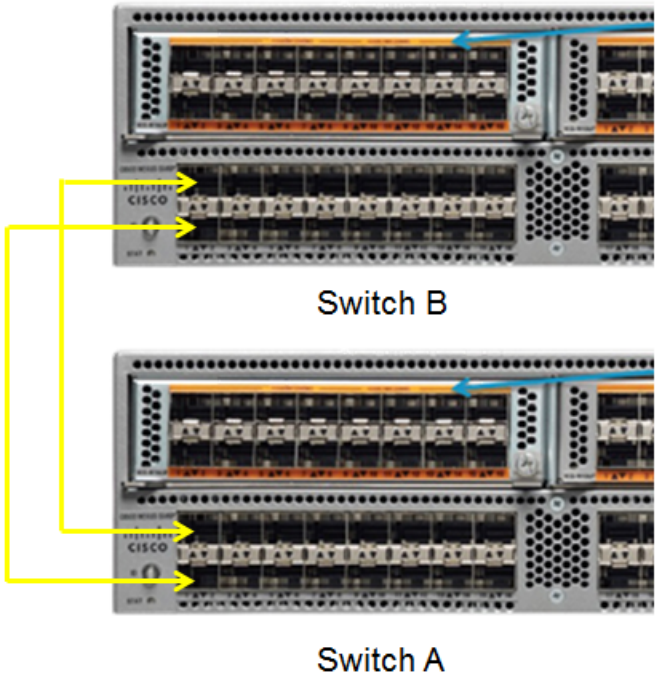


5. Repeat steps 2-4 to mount the other Cisco Nexus 5596UP switch in rack unit 39.

6. Locate two one meter Twinax cables.

7. Plug one end of the first one meter Twinax cables into port 01 switch in rack position U39, and plug the other end into port 01 of the switch in rack position U37.

8. Plug one end of the second one meter Twinax cables into port 02 switch in rack position U39, and plug the other end into port 02 of the switch in rack position U37.



9. Use two M5 screws with plastic washer to install four 1U perforated blanking panels in the front of rack units 37, 38, 39, and 40.

Step 9d: Connect the Cisco Nexus 5596UP power cables to the PDUs

The Cisco Nexus 5596UP Ethernet switches in rack units U37 and U39 should be plugged into outlets in the upper half of the left and right upper zero U mounted PDUs. Power supplies on the left side of the components should be connected to the upper left PDU. Power supplies on the right side of the components should be connected to the upper right PDU. You can use any outlets as long as the outlets are all on the upper half circuit breaker.

Note: This PDU connection information is specific to HDS PDUs. If you are supplying the PDUs, or the equipment is being racked in positions other than the recommended locations, this information needs to be modified for yourHCP environment.

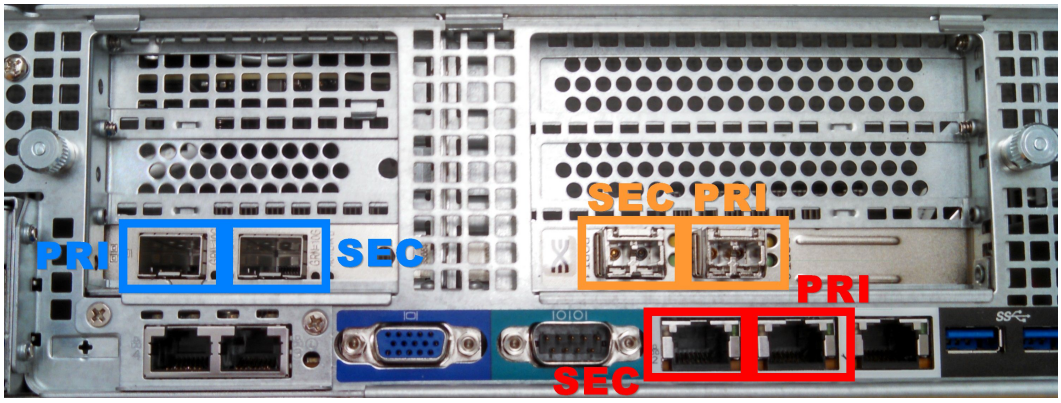
Step 9e: HCP G10 Node 10G port diagrams

For HCP systems with 10G back-end switches (Brocade VDX 6740, Cisco Nexus 5548UP, or Cisco Nexus 5596UP), the HCP G10 Node Ethernet ports can be set up for two different 10GbE back-end configurations. The pictures below show all of the possible ways to configure Ethernet ports on a HCP G10 Node with attached storage.

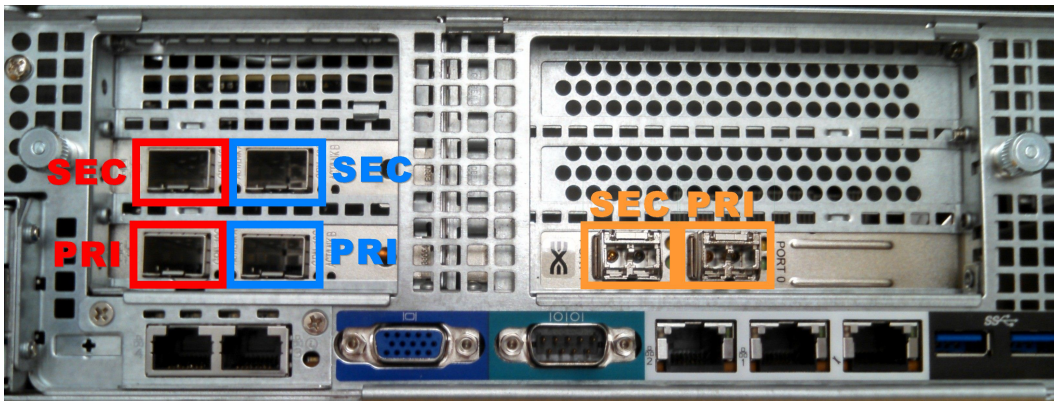
In the following pictures, ports with red frames indicate the front-end network connections. Ports with blue frames in the pictures are for the back-end network connection, and ports with orange frames are for Fibre Channel switches.

PRI denotes primary ports, 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. SEC denotes secondary ports, 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 G10 Node with 10G SFP+ ports for back-end network connections.



The following image shows an HCP G10 Node with 10G SFP+ ports for both front-end and back-end connections.



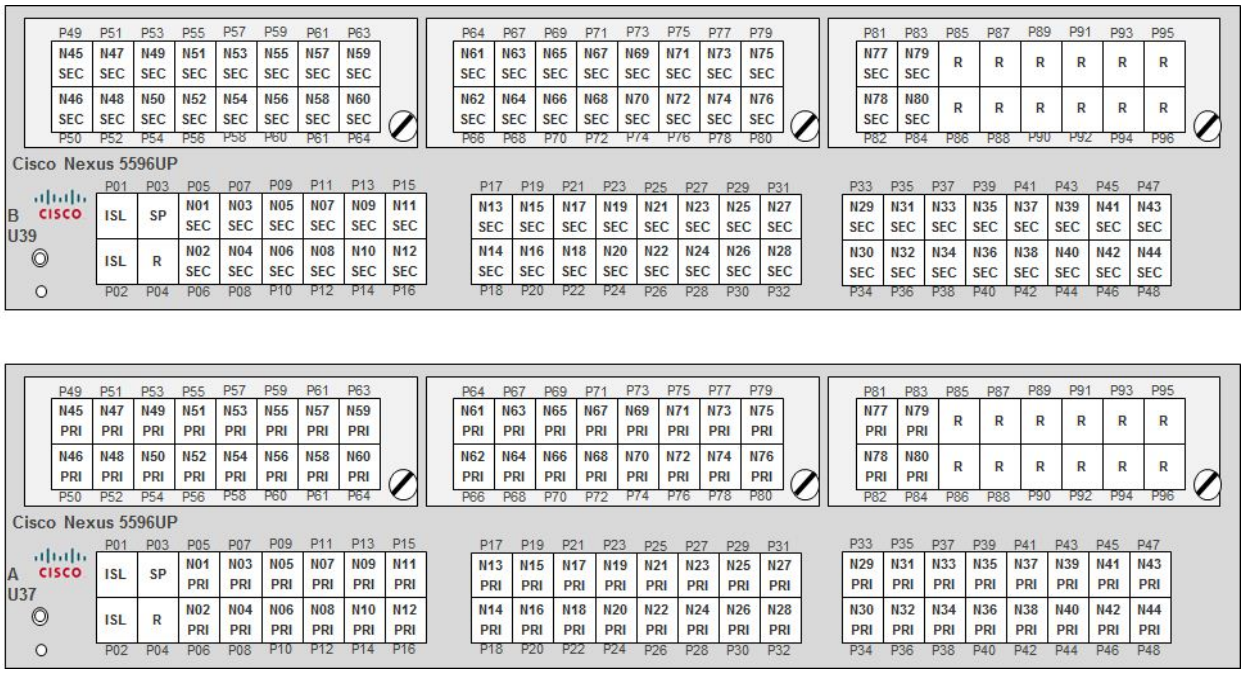
Step 9f: Cisco Nexus 5596UP port diagram

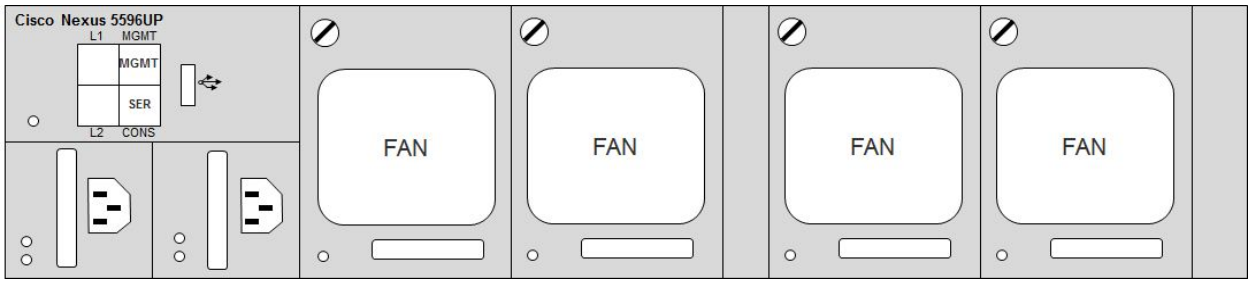
An HCP system comes with all the Twinax cables needed to support the ordered number of nodes. Individual Twinax cables are used to connect the Ethernet switches together as well as the individual nodes to the Ethernet switches. Please follow the instructions below to connect the Twinax cables.

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





Step 9g: Connect the Cisco Nexus 5596 Ethernet cables

To connect the cables:

1. Locate and separate the three meter and five meter Twinax cables. The three meter cables are used to connect the Cisco Nexus 5596UP switches in the Base or Appliance rack to the HCP G10 Nodes. If there are five meter Twinax cables, they are used to connect nodes 17-80 in the Expansion racks to the back-end switches in the Base rack.

2. Locate the label sheet(s) containing pairs of numbered decals.

3. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

4. Connect one end of the Twinax cable to the Cisco Nexus 5596UP switch in rack position U27 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue PRI port corresponding node number in the Appliance or Base rack.

5. Starting at label 01 and proceeding sequentially, peel off the first of the pair and attach it to one end of the Twinax cable. Peel off the second of the pair and attach it to the other end of the Twinax cable.

6. Connect one end of the Twinax cable to the Cisco Nexus 5596UP switch in rack position U28 using the port for the node with the corresponding cable number. Connect the other end of the Twinax cable to the blue SEC port corresponding node number in the Appliance or Base rack.

7. Repeat steps 3-6 for each of the nodes in the Appliance or Base rack.

8. Neatly bundle and tie off the Twinax cables to the cable management attachments in the rear of the rack.

9. If there are additional nodes in the system housed in Expansion racks, repeat steps 3-8 for each Expansion rack adding 16 to the base node number. For all Expansion racks, ensure you are using the five meter Twinax cables.

Step 10: 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.

4

Connecting the HCP system at your site

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

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

For a system ordered without a rack, the instructions in Chapter 3: "Assembling rackless components" on page 23, tell you how to make all the internal connections.

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

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

This chapter provides instructions for these activities.

Connecting to the power sources

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

Each node is connected to two PDUs for redundancy.

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

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

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

1. Power on the controller tray (that is, the bottommost tray) in each storage array. This causes the other trays in the array to power on automatically.

2. Wait for the arrays to be online and ready to serve requests from the HCP nodes.

3. Power on the nodes.

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

Connecting to your corporate network

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

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 G10 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 G10 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 G10 Node can have multiple network configurations. For more information on connecting your front-end network to your HCP G10 nodes, see Step 9e: "HCP G10 Node 1 GB port diagram" on page 89 or Step 9e: "HCP G10 Node 10G port diagrams" on page 121 and connect your cables to the red ports in the appropriate node diagram.

Important: The default front-end IP addresses for the HCP nodes go from 192.168.100.101 through 192.168.100.104 (or higher for a system with more that four nodes). If these IP addresses don't work for your computing environment, you need to change them *before* you connect the HCP nodes to your corporate network. For information on doing this, see "Chapter 5: Reconfiguring the HCP system for your site" on page 129.

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

5

Reconfiguring the HCP system for your site

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

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

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

This chapter explains how to:

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

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

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

Preparing to reconfigure the system

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

Step	Activity	More information
1	Connect a client computer to the HCP default back-end network.	Step 1: "Connect to the HCP default back-end network" below below
2	Log into the System Management Console with the initial user account.	Step 2: "Log in with the initial user account" on the facing page
3	Check the health of the HCP system.	Step 3: "Check the health of the HCP system" on page 132
4	Create a new user account with the service role.	Step 4: "Create a service account" on page 133
5	Log into the System Management Console with the new user account.	Step 5: "Log in with the service account" on page 134

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

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

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

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

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

2. If the client computer is not in the HCP default back-end subnet:

a. Make a note of the current IP address and subnet mask for the client computer so you can reset them after you change the network settings for the HCP system.

b. On the client computer, set the IP address for the local area network to 10.1.1.100.

c. On the client computer, set the subnet mask to 255.255.255.0.

Step 2: Log in with the initial user account

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

1. On a computer connected to the HCP back-end network, open a browser window.

2. In the address field, enter:

   https://10.1.1.101:8000

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

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

   The System Management Console login page appears.

4. In the **Username** field, type this case-sensitive username: *security*

5. In the **Password** field, type this case-sensitive password: *Chang3Me!*

6. Click on the **Log In** button.

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

7. On the **Change Password** page:

   - In the **Existing Password** field, type: *Chang3Me!*

   - In the **New Password** field, type a new password for the *security* account.

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

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

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

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

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

Step 3: Check the health of the HCP system

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

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

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

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

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

Step 4: Create a service account

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

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

     To be valid, a password must include at least one character from two of these three groups: alphabetic, numeric, and other.
   - In the **Confirm Password** field, type the password again.

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

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

   The Console returns to the login page.

Step 5: Log in with the service account

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

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

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

Verify the serial number

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

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

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

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.

2. In the secondary menu, click on **Miscellaneous**.

3. 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.

4. 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 on the **Update Settings** button.

Changing network settings

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

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

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

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

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

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

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

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

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

  ```
  #W#D#H#M#S
  ```

  These considerations apply to specifying the refresh rate:

  - In each case, # must be an integer greater than or equal to one.
  - If an integer is specified without a time unit, the time unit is assumed to be seconds.
  - Time units can be specified in any order.
  - Any given time unit can be specified only once.
  - Time units are not case sensitive.
  - The total time specified must be in the range one through 2,147,483,647 seconds.

- The back-end IP address to use for each HCP node. You can change only the first three octets of the back-end IP addresses. You cannot change the fourth octet.

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

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

Changing the front-end network settings

To change the HCP front-end network settings:

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.
2. In the secondary menu, click on **Networks** to display the **Networks** page.

3. In the list of networks, click on [hcp_system].
4. In the panel for the [hcp_system] network:
   - To change the gateway IP address, in the **Gateway** field, type the new IP address.
   - To change the subnet mask, in the **Netmask** field, type the new subnet mask.
   - To make the front-end network tagged, select the **Make tagged network** option. Then, in the **VLAN ID** field, type a unique VLAN ID for the network. Valid values are integers in the range one through 4,095.
   - To change the DNS settings for the network, click on the **Downstream DNS Configuration** link. Then:
     - To enable or disable hidden master, select or deselect, respectively, the **Enable hidden master** option.
     - To enable or disable notify, select or deselect, respectively, the **Enable notify** option.
     - If you are enabling hidden master or notify, in the **Downstream DNS Servers** field, type a comma-separated list of the IP addresses of one through ten downstream DNS servers. Spaces are not allowed.
     - To change the refresh rate, in the **Refresh Rate** field, type the new refresh rate. For valid values for the refresh rate, see "Changing network settings" on page 135 above.
   - To change the node IP addresses, in the **Node IP Addresses** section, type new front-end IP addresses for the nodes in the HCP system.

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

5. Click on the **Update Settings** button.

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

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

7. Click on the **Update Settings** button.

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

8. If you do not need to change the back-end settings, you can now safely connect the HCP system to your corporate network.

9. Log back into the System Management Console after the system restarts. Then proceed to the next configuration activity.

Changing the back-end network settings

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

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.

2. In the secondary menu, click on **Networks** to display the **Networks** page.

3. In the list of networks, click on [hcp_backend].

4. In the **Node IP Addresses** section in the [hcp_backend] panel, type new backend IP addresses for the nodes in the HCP system.

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

5. Click on the **Update Settings** button.

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

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

7. Click on the **Update Settings** button.

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

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

1. Change the IP address of the client computer to match the new HCP back-end subnet.

2. 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 on doing this, see *Administering HCP*.

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

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

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

To change the HCP system DNS settings:

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.
2. In the secondary menu, click on **DNS**.
3. On the **DNS Settings** page:
    - Do either of these:
        - If you want to use DNS with HCP, select the **Use DNS** option.
        - If you don't want to use DNS with HCP, deselect the **Use DNS** option and skip to Step 4.

- Optionally, in the **Hostname Prefix** field, type a new hostname prefix. The hostname prefix can be from one through 12 characters long and can contain only lowercase letters, numbers, and hyphens (-).

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

- In the **Upstream DNS Servers** field, type a comma-separated list of the IP addresses of all the upstream DNS servers. Spaces are not allowed.

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

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

Changing time settings

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

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

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

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

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

To change the time settings for the HCP system:

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.
2. In the secondary menu, click on **Time**.
3. 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.
4. Click on 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 on the **Update Settings** button.

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

Making the back-end switches known to HCP

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

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

To make the back-end switches known to HCP:

1. In the top-level menu in the System Management Console, mouse over **Configuration** to display a secondary menu.
2. In the secondary menu, click on **Monitored Components**.
3. On the **Monitored Components** page, for each switch:
   a. Click on **Add**.

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

      If you inadvertently add an extra row, click on 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.
4. Click on the **Update Settings** button.

6

Configuring HCP monitoring with Hi-Track Monitor

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

Hi-Track Monitor is for monitoring and error notification purposes only. It does not allow any changes to be made to the system.

Hi-Track Monitor 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 Hi-Track servers. However, Hi-Track support for IPv6 network connections varies based on the Hi-Track server operating system. For information on requirements for Hi-Track servers that support IPv6 networks, see the applicable Hi-Track documentation.

This chapter explains how to set up monitoring of HCP nodes with Hi-Track Monitor. For information on setting up storage monitoring, see the Hi-Track Monitor documentation.

The chapter assumes that Hi-Track Monitor is already installed and running according to the documentation that comes with the product.

Enabling SNMP in HCP

To enable Hi-Track Monitor 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, Hi-Track Monitor is configured to support SNMP version 1 or 2c with the community name *public*. If you change the community name in HCP or if you select version 3, you need to configure a new SNMP user in Hi-Track Monitor to match what you specify in HCP. For more information on this, see the Hi-Track Monitor documentation.

To enable SNMP in HCP for use with Hi-Track Monitor:

1. Log into the HCP System Management Console using the initial user account, which has the security role.

2. In the top-level menu in the System Management Console, mouse over **Monitoring** to display a secondary menu.

3. In the secondary menu, click on **SNMP**.

4. In the **SNMP Settings** section on the **SNMP** page:

   - Select the **Enable SNMP at snmp.*hcp-domain-name*** option.

   - Select either **Use version 1 or 2c** (recommended) or **Use version 3**.

     If you select **Use version 3**, specify a username and password in the **Username**, **Password**, and **Confirm Password** fields.

   - Optionally, in the **Community** field, type a different community name.

5. Click on the **Update Settings** button.

6. 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 Hi-Track Monitor is installed. Then click on the **Add** button.

7. Log out of the System Management Console and close the browser window.

Configuring Hi-Track Monitor

To configure Hi-Track Monitor to monitor the nodes in the HCP system, follow the steps outlined in the table below.

Step	Activity	More information
1	Log into Hi-Track Monitor.	Step 1: "Log into Hi-Track Monitor" below
2	Set the Hi-Track Monitor base configuration, including the email addresses to which email about error conditions should be sent.	Step 2: "Set the base configuration" on the next page
3	Optionally, configure transport agents for reporting error conditions to HDS support personnel.	Step 3 (conditional): "Configure transport agents" on page 147
4	Identify the HCP system to be monitored.	Step 4: "Identify the HCP system" on page 148

Step 1: Log into Hi-Track Monitor

To log into Hi-Track Monitor:

1. Open a web browser window.
2. In the address field, enter the URL for the Hi-Track Monitor server (using either the hostname or a valid IP address for the server) followed by the 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 Hi-Track Monitor is already in use at your site for monitoring other devices, this password may have been changed. In this case, see your Hi-Track Monitor administrator for the current password.

5. Click on the **Logon** button.

Step 2: Set the base configuration

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

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

To set the Hi-Track Monitor base configuration:

1. In the row of tabs at the top of the Hi-Track Monitor interface, click on **Configuration**.

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

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

   - In the **Site ID** field, type your HDS customer ID. If you don't know your customer ID, contact your authorized HCP service provider for help.

   - Optionally, specify different values in the other fields to meet the needs of your site. For information on these fields, click on the **Help on this table's entries** link above the fields.

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

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

   - In the **Local Interface** field, select the Ethernet interface that has connectivity to the specified email server. (This is the interface on the Hi-Track Monitor server.)

   - In the **User List** field, type a comma-separated list of the email addresses to which Hi-Track Monitor should send email about error conditions.

- In the **Sender's Email Address** field, type a well-formed email address to be used in the From line of each email.

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

4. Click on the **Submit** button.

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

Step 3 (conditional): Configure transport agents

A Hi-Track Monitor transport agent transfers notifications of error conditions to a target location where HDS 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. Hi-Track tries them in the order in which they are listed until one is successful.

To configure a transport agent:

1. In the row of tabs below **Configuration**, click on **Transport Agents**.

2. In the field below **Data Transfer Agents**, select the transfer method for the new transport agent.

3. Click on the **Create** button.

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

4. In the configuration fields, specify the applicable values for the new transport agent. For information on what to specify, see the Hi-Track Monitor documentation.

5. Click on the **Submit** button.

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

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

2. Click on the **Submit** button.

Step 4: Identify the HCP system

To identify the HCP system to be monitored:

1. In the row of tabs at the top of the Hi-Track Monitor interface, click on **Summary**.

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

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

2. Take one of these actions:

   - If the **Summary** page doesn't display any tables, click on the **Add a device** link.

   - If the **Summary** page displays one or more tables, click on 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 HDS 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 on configuring SNMP in HCP, see "Enabling SNMP in HCP" on page 144.

11. In the **Comms Error Reporting?** field, select one of these options to specify whether Hi-Track should report communication errors that occur between Hi-Track Monitor 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 on the **Add** button.

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

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