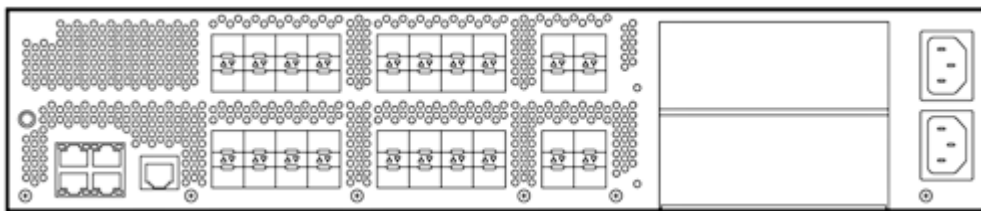


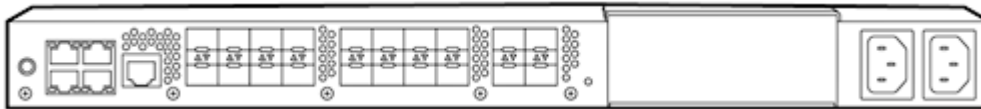
Overview

Data centers are increasingly filled with dense rack-mount and blade servers that host powerful multi-core processors. This is pushing demand for 10 Gigabit Ethernet and consolidated I/O: applications for which the Nexus 5000 Series is the perfect match. With low latency, front-to-back cooling, and rear-facing ports, this family of datacenter switches is designed for transitioning to 10 Gigabit Ethernet and deploying a unified fabric that can handle LAN, SAN, and server cluster networks over a single link.

The Nexus 5000 Converged Network switches supports line-rate 10 Gigabit Ethernet on all ports while maintaining consistently low latency. It supports a set of network technologies known collectively as IEEE Data Center Bridging (DCB) that increases the reliability, efficiency, and scalability of Ethernet networks. These features allow support of multiple traffic classes over a lossless Ethernet fabric, thus enabling consolidation of LAN, SAN, and cluster environments. Its ability to connect FCoE to native Fibre Channel protects existing storage system investments while simplifying in-rack cabling.



HP C-series, Nexus 5020 Converged Network Switch



HP C-series, Nexus 5010 Converged Network Switch

Key Features and Benefits

Convergence and Compatibility

High performance and compatibility with Existing Fibre Channel Fabrics

- The combination of high port density, lossless Ethernet, wire-speed performance, and extremely low latency makes the switch an ideal product to meet the growing demand for 10 Gigabit Ethernet that can support unified fabric in enterprise and service provider data centers, protecting enterprises' investments. The switch family has sufficient port density to support single and multiple racks fully populated with blade and rack-mount servers.
- Nexus 5000 switch can be deployed as a Top-of-Rack, access-layer switch in parallel with existing Fibre Channel SANs

Application Flexibility

Nexus 5000 Series supports a number of application scenarios that use it as an access-layer switch co-located with servers in data center racks or for middle-of-row deployments.

- Built for today's data centers, the switches are designed just like the servers they support. Ports and power connections are at the rear, closer to server ports, helping keep cable lengths as short and efficient as possible, delivering benefits traditionally offered on blade servers to rack servers as well. Hot-swappable power and fan modules can be accessed from the front panel, where status lights offer an at-a-glance view of switch operation. Front-to-back cooling is consistent with server designs, supporting efficient data center hot- and cold-aisle designs. Serviceability is enhanced with all customer-replaceable units accessible from the front panel. The use of SFP+ ports offers increased flexibility to use a range of interconnect solutions, including copper Twinax cable for short runs and fiber for long runs.
- As a rack-level I/O consolidation platform, the switch carries Ethernet traffic from servers to the aggregation layer and carries FCoE traffic to existing Fibre Channel SANs.



Overview

- As a crucial element in data center I/O consolidation, the switch paves the way with I/O consolidation at the access layer and interoperability with the Nexus 5000 Series and other standards-based products.

Consolidated Resource Management

Easy to configure and manage

- IEEE DCB enables Ethernet fabrics to support lossless transmission to increase network scalability, support I/O consolidation, ease management of multiple traffic flows, and optimize performance. Although implementing SAN consolidation requires only the lossless fabric provided by the Ethernet pause mechanism, the Nexus 5000 Series provides additional features that create an even more easily managed, high-performance, unified network fabric.
- Software manageability and serviceability features based on SNMP standards. Security is enhanced through role-based access control (RBAC); support for authentication, authorization, and accounting (AAA), remote TACACS+, and RADIUS servers; and Secure Shell (SSH) access.

Unified Fabrics

- FCoE is part of the unified network fabric that enables I/O consolidation at the rack level. It is a straightforward encapsulation of Fibre Channel within Ethernet that preserves existing Fibre Channel network management models and tools, helping protect investments in software and staff training.

I/O Consolidation

Reduces capital and operating expense

- I/O consolidation in racks and rows helps reduce capital and operating costs by reducing the number of server adapters, cables, and upstream switches needed to support I/O at the rack level. Rather than the overhead of a redundant pair of adapters for each of up to three networks (LAN, SAN, and cluster), I/O consolidation supports all three networks on a single link. The switch family connects to native Fibre Channel networks, protecting existing investments in storage networks. The switch family's support for FCoE also supports data center I/O consolidation. As FCoE-enabled switching becomes available across the data center, FCoE traffic can travel over a unified network fabric directly to future FCoE-enabled storage devices or to native Fibre Channel SANs.

Energy Efficient

Lowers carbon footprint

- Energy efficiency achieved through the use of the Nexus 5000 Series Switches helps data centers operate within their space, power, and cooling parameters while reducing their carbon footprints. Every network link at the rack level requires adapters, switches, and transceivers, all of which consume power. I/O consolidation reduces energy consumption by eliminating the need for separate Fibre Channel adapters, cables, and switches. In many cases, server cluster networks also can be consolidated onto 10 Gigabit Ethernet networks, especially given the low latency of the Nexus 5000 Series. The switch hardware is also designed for energy efficiency. Variable-speed fans consume only the amount of power necessary to cool the chassis at any point in time. The switch power supplies are sized to support worst-case scenarios, where inefficient SFP+ transceivers increase power draw; however, when low-power cabling solutions are deployed, the switch family's power supplies maintain 90 percent efficiency at only 25 percent utilization, making efficient use of power in best-case scenarios.



Product Highlights

Configuration support

Please see the following Web site for configuration support at:

<http://h18000.www1.hp.com/products/storageworks/san/documentation.html>

IEEE DCB Feature

Priority flow control (PFC)

- Simplifies management of multiple traffic flows over a single network link
- Creates lossless behavior for Ethernet by allowing class-of-service (CoS)-based flow control

Bandwidth management

- Enables consistent management of quality-of-service (QoS) at the network level by providing consistent scheduling of different traffic types (IP, storage, etc.)

Data Center Bridging Exchange (DCBX) Protocol

- Simplifies network deployment and reduces configuration errors by providing auto-negotiation IEEE DCB features between the NIC and the switch and between switches

Congestion management (backward congestion notification [BCN])

- Pushes congestion to network edges, providing better control over QoS (future release); the Nexus 5000 Series hardware supports a precursor to IEEE 802.1Qau called BCN, which will be made available based on availability of other system components, such as adapters and core switches and routers

Layer 2 multipathing

- Allows active-active uplinks from access switch
- Increases network performance and Layer 2 domain scale

FCoE

- Transparently encapsulates Fibre Channel packets into Ethernet
- Enables I/O consolidation at the rack level by significantly reducing network-related cabling, power, and cooling

NX-OS Software

- NX-OS Software simplifies the data center operating environment and provides a unified OS designed to run all areas of the data center network, including the LAN, SAN, and Layer 4 to 7 network services.

Performance

- Nexus 5020: Layer 2 hardware forwarding at 1.04 Tbps or 773.8 million packets per second (mpps)
- Nexus 5010: Layer 2 hardware forwarding at 520 Gbps or 386.9 million packets per second (mpps)
- MAC address table entries: 16,000
- Low latency cut-through design provides predictable, consistent traffic latency regardless of packet size, traffic pattern, or enabled features

Non-disruptive Software Upgrades

The Nexus 5000 series supports non-disruptive software upgrades to minimize service disruptions in a highly available networking environment.



Product Highlights

Compatibility with HP Converged Network Adapters (CNAs)

The HP Dual Port Converged Network Adapters (CNAs) are dual port adapters that provide both Ethernet and Fibre Channel (FC) connectivity over 10GbE using both Fibre Channel over Ethernet (FCoE) and Converged Enhanced Ethernet (CEE) standards. By consolidating Ethernet and FC onto a converged network adapter, HP CNAs reduce the number of separate adapters and cables required for your datacenter and also reducing operational, power and cooling costs while preserving existing Ethernet and Fibre Channel infrastructure. HP CNAs have also been thoroughly tested with HP ProLiant servers and HP Top of Rack (ToR) switches to ensure an optimal HP FCoE solution for your datacenter

Efficient Transceiver and Cabling Options

The high bandwidth of 10 Gigabit Ethernet poses challenges to data transmission that are met by the transceiver and cabling options supported by the Nexus 5000 family. The product family supports an innovative Twinax copper cabling solution that connects to standard SFP+ connectors for in-rack use, and optical cabling for longer cable runs

- For in-rack or adjacent-rack cabling, the Nexus 5000 Series supports SFP+ direct-attached 10 Gigabit Ethernet copper, an innovative solution that integrates transceivers with Twinax cables into an energy-efficient, low-cost, and low-latency solution. SFP+ direct-attached 10 Gigabit Twinax copper cables uses only 0.1 watt (W) of power per transceiver and introduces only approximately 0.25 microsecond of latency per link.
- For longer cable runs, the Nexus 5000 Series supports multimode, short-reach optical SFP+ transceivers. These optical transceivers use approximately 1W per transceiver and have a latency of less than 0.1 microsecond.

Both of these options provide lower latency and higher energy efficiency than 10GBASE-T. This standard uses transceivers that consume 4 to 8W per transceiver and contribute a latency of up to 2.5 microseconds per link, making the 10GBASE-T standard a significant contributor to network-level power consumption.

Simplified Storage Management

Consistent management for HP C-series switch products is provided through consistency of both NX-OS Software and MDS 9000 SAN-OS Software management models and tools. The switch family network features can be managed using the command-line interface (CLI), and the Fibre Channel and FCoE features can be managed through the Fabric Manager Suite. In a future release, Data Center Network Manager (DCNM) and VFrame will support the Nexus 5000 Series switch family. The capability to manage Ethernet and FCoE features independently with existing Cisco tools preserves existing management models, best practices, and investments in staff training. In addition, Simple Network Management Protocol (SNMP) MIBs, XML, and the familiar CLI are made available to customers for switch management through third-party and custom-developed tools. The switch family is based on NX-OS Software for superior operational efficiency, pervasive security, and continuous operation even through software upgrades.



Product Highlights

Modular Expansion

The Nexus 5000 Series is equipped to support expansion modules that can be used to increase the number of 10 Gigabit Ethernet, and FCoE ports or connect to Fibre Channel SANs with 1/2/4/8-Gbps Fibre Channel switch ports, or both. The Nexus 5020 supports any combination of two modules from the following offerings.

1. Ethernet module that provides 6 ports of 10 Gigabit Ethernet, and FCoE using the SFP+ interface
2. Fibre Channel plus Ethernet module that provides 4 ports of 10 Gigabit Ethernet, and FCoE using the SFP+ interface, and 4 ports of 1/2/4-Gbps native Fibre Channel connectivity using the SFP interface
3. Fibre Channel module that provides 6 ports of 1/2/4/8-Gbps native Fibre Channel using the SFP interface for transparent connectivity with existing Fibre Channel networks
4. Fibre Channel module that provides 8 ports of 1/2/4-Gbps native Fibre Channel using the SFP interface for transparent connectivity with existing Fibre Channel networks

Diagnostics

- NX-OS Software is built with unique serviceability functions to enable network operators to take early action based on network trends and events, enhancing network planning and improving network operations center (NOC) and vendor response times. Integrated Call Home capability enhance the serviceability of NX-OS Software.
- GOLD is a suite of diagnostic facilities to verify that hardware and internal data paths are operating as designed. Boot-time diagnostics, continuous monitoring, and on-demand and scheduled tests are part of the GOLD feature set. This industry-leading diagnostics subsystem allows rapid fault isolation and continuous system monitoring, critical in today's continuously operating environments.

Software Components, Included

NX-OS NX-OS Software Release 4.0(X) interoperates with products running any variant of the Cisco IOS Software operating system. NX-OS Software Release 4.0 also interoperates with any networking OS that conforms to the networking standards listed as supported in this data sheet.

Software Components, Optional

Fabric Manager Server Package The Fabric Manager Server (FMS) Package extends device configuration and troubleshooting provides historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.



Service and Support and Warranty Information

Warranty (1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor.

NOTE: The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the link below:

<http://h18005.www1.hp.com/services/carepaq/us/install/>

<http://h18005.www1.hp.com/services/carepaq/us/hardware/>.

NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

Software Product Services Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

EXCLUSIVE REMEDY -The entire liability of HP and its suppliers and your exclusive remedy for software that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to HP in the country in which you obtained the software.

NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

For increased uptime, productivity and ROI -HP Care Pack packaged services for Storage

These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as: flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty

When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

Extending warranties with HP Care Pack Services

For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your specific requirements, from preliminary planning and



Service and Support and Warranty Information

equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

HP Storage Services: Offering reliability, flexibility and value-just like your storage

HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. <http://www.hp.com/hps/storage>

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at <http://www.hp.com/go/lookuptool>

Recommended HP Care Pack Services for optimal satisfaction with your HP product.

Recommended Support

3-Year HP Support Plus 24

For a higher return on your storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- Improve uptime with responsive hardware and software services
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP software at a predictable cost
- Increase customer satisfaction-with no interoperability gaps

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf>

Recommended Deployment

HP Enterprise NAS Implementation Service

For smooth startup and better business outcomes, HP Enterprise NAS Implementation Service - provides implementation of HP Enterprise NAS in your storage environment.

- Allows your IT resources to stay focused on their core tasks and priorities
- Customized implementation to meet your business's configuration requirements
- Reduces implementation time, impact and risk to your storage environment
- Helps ensure a successful implementation for complex deployments by providing HP project management
- Helps you more effectively utilize HP product by knowledge gained from HP Service specialist during onsite delivery of the service

[http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-9419ENW .pdf](http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-9419ENW.pdf)



Service and Support and Warranty Information

Related HP Care Pack Services that will enhance your HP product experience.

Related Services **3-Year HP Proactive 24 for SANs**

As an alternative to our recommended support level, for customers who want improved SAN availability and access to a wide range of proactive and reactive services:

HP Proactive 24 Service for SANs is an integrated hardware and software support service that combines proactive problem prevention with responsive 24x7 assistance for rapid problem resolution.

A collaborative relationship with HP Services strengthens your IT team and gives you direct access to our technical expertise as issues arise.

Improve IT staff skills, increase SAN productivity.

Proactive 24 Service for SANs can help you:

- Enhance the skills and efficiency of your IT staff through knowledge transfer, shared best practices in storage management, and hands-on assistance
- Improve SAN availability through access to a wide range of proactive and reactive services
- Boost productivity through effective change management, configuration assistance, and performance optimization
- Increase the return on your SAN investment
- Enhance your overall operational effectiveness

Expert single-point-of-contact assistance 24x7

An assigned HP Services account manager is your primary contact for proactive services and access to HP's diverse technical resources. Your account manager works closely with your IT staff to understand your goals, document the components of your infrastructure, recommend changes to improve performance and stability, and monitor ongoing operations through HP's industry-leading remote monitoring and support tools.

<http://h20219.www2.hp.com/services/cache/11157-0-0-225-121.html>

HP Assessment Service for SANs

For customers interested in improving availability of their SAN and decreasing potential for unplanned downtime:

The HP Assessment Service for SANs offers customized technical and operational guidance to customers employing HP storage subsystems and the interconnecting storage area network (SAN) infrastructure. In a typical engagement, HP or one of our authorized business partners will perform a detailed discovery using HP's proprietary toolset to gain an understanding of the configuration of your storage devices and SAN topology.

The findings from this process will be compared to HP best practices and industry standards as defined by IT Service Management (ITSM) disciplines. The results of the evaluation will be quickly and efficiently processed into information you can leverage. This information, in the form of a comprehensive HP SAN Assessment report, will be summarized by HP or one of our authorized business partners with recommendations that are intended to improve availability levels and ongoing management of your storage and SAN environment.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/5981-9510EN.pdf>



Service and Support and Warranty Information

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: <http://www.hp.com/support>

Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. www.hp.com/learn/storage

HP Services Awards

HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit <http://h20219.www2.hp.com/services/cache/433028-0-0-225-121.html>.

Additional Services Information

For more information about HP Care Pack Services for Storage, please visit: <http://www.hp.com/hps/storage>

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" <http://www.hp.com>



Family Information

	Nexus 5010	Nexus 5020
Introduction Date	June 2009	June 2009
Switch Type	Converged Network Fabric Switch (FCoE)	Converged Network Fabric Switch (FCoE)
Maximum ports	26, 10GbE, or 20, 10GbE plus up to 8, 4Gb Fibre Channel ports or 6, 8Gb Fibre Channel ports	52 10GbE, or 40, 10GbE plus up to 16, 4Gb Fibre Channel ports or 12, 8Gb Fibre Channel ports
Number of slots per chassis	One	Two

NOTE: Please Refer to SAN Design Guide pointer:

<http://www.hp.com/go/sandesignhor> <http://www.hp.com/go/sandesignguide>.



Configuration Information

The Nexus 5010 is a 1RU, 10 Gigabit Ethernet, FCoE, and 1/2/4/8-Gbps Fibre Channel switch providing more than 500-Gbps throughput with very low latency. It has 20 fixed 10 Gigabit Ethernet, and FCoE SFP+ ports. One expansion module slot can be configured to support up to 6 additional 10 Gigabit Ethernet and FCoE SFP+ ports, up to 6 or 8 Fibre Channel switch ports, or a combination 4 additional 10 Gigabit Ethernet, and FCoE SFP+ ports with 4 additional Fibre Channel switch ports.

The Nexus 5020 is a two rack-unit (2RU), 10 Gigabit Ethernet, and FCoE 1/2/4/8-Gbps Fibre Channel switch built to provide 1.04 terabits per second (Tbps) throughput with very low latency. It has 40 fixed 10 Gigabit Ethernet, and FCoE Small Form Factor Pluggable Plus (SFP+) ports. Two expansion module slots can be configured to support up to 12 additional 10 Gigabit Ethernet, and FCoE SFP+ ports, up to 12, 14, or 16 Fibre Channel switch ports, or a combination of both. The switch has a serial console port and an out-of-band 10/100/1000-Mbps Ethernet management port.

Both the Nexus 5010 and 5020 switches are powered by 1+1 redundant, hot-pluggable power supplies and 4+1 redundant, hot-pluggable fan modules to provide highly reliable front-to-back cooling. These switches also include the Nexus 5000 Storage Services Software License which is factory enabled.

Step 1 – Base Configuration

Select one:

Model	Model Description	Part Number
Nexus 5010 Converged Network Switch	Nexus 5010 with 20 fixed 10Gb Ethernet ports, plus one open expansion slot and dual power supplies and two power cords. Base unit includes Storage Services Software license to use which is factory enabled. NOTE: No SFPs included. Desired PDU or Country Power Cords must be selected when ordering.	AP775A
Nexus 5020 Converged Network Switch	Nexus 5020 with 40 fixed 10Gb Ethernet ports, plus two open expansion slots and dual power supplies and two power cords. Base unit includes Storage Services Software license to use which is factory enabled. NOTE: No SFPs included. Desired PDU or Country Power Cords must be selected when ordering.	AP776A

Nexus 5000 Power Cords (Select From Desired Feature Codes Indicated Below)

Feature Code	Country	Description	Qty
#ABA	US	PWR-CORD OPT-903 3-COND 3.0-M-LG ROHS	2



Configuration Information

Step 2 – Required Options

Select each required option with quantities specified:

Quantity	Description with Parts Shipped	Part Number
Min 1 per switch	HP Nexus 5000 6-port 8Gb FC Module NOTE: Optional - One FC Port Module AW562A, AP779A or AP778A required per switch for FC SAN attachment.	AW562A
Min 1 per switch	HP Nexus 5000 8-port 4Gb FC Module NOTE: Optional - One FC Port Module AW562A, AP779A or AP778A required per switch for FC SAN attachment.	AP779A
Min 1 per Switch	HP Nexus 5000 4-port FC + 4-port 10GbE Module NOTE: Optional - One FC Port Module AW562A, AP779A or AP778A required per switch for FC SAN attachment.	AP778A
1 min, 12 max	HP MDS 9000 8Gb FC SFP+, Short Range XCVR NOTE: Optional - Must be ordered separately.	AJ906A
1 min, 12 max	HP MDS 9000 8Gb FC SFP+, Long Range XCVR NOTE: Optional - Must be ordered separately.	AJ907A
1 min, 4 max	HP MDS 9000 4Gb FC SFP, 4pk Short Range XCVR NOTE: Optional - Must be ordered separately.	AE379A
	HP MDS 9000 4Gb FC SFP, Long Range XCVR NOTE: Optional - Must be ordered separately.	AE380A
1 min, 50 max	HP C-series 10Gb Ethernet Short Range SFP+ Transceiver	AP783A

NOTE: Each 4Gb FC port on the Nexus 5000 switch may be configured to accept Short or Long Wave 4Gb FC SFP optical transceivers. Each 8Gb FC port on the Nexus 5000 switch may be configured to accept Short or Long Wave 8Gb or 4Gb FC SFP optical transceivers. However, when ordering the active FC ports must be populated with above SFP optical transceivers or with other transceivers listed later in this document. (No substitutes allowed) Using other transceivers may void product warranty.

Step 3 – Additional Options

	Quantity	Description	Part Number
Ethernet Only Expansion Module	1 Max	HP Nexus 5000 6-port 10GbE Module	AP777A
Recommended Software	1 per Switch	HP Nexus 5000 Fabric Manager Server License NOTE: This LTU NOT REQUIRED for HP Nexus 5010 switch, Part Number AP775A	TA729A
Recommended Converged Network Adapters (CNA)	Up to one CNA	HP CN1100E Dual Port Converged Network Adapter	BK835A
	for every two	HP CN1000Q Dual Port Converged Network Adapter	BS668A
	FCoE switch ports	HP CN1000E Dual Port Converged Network Adapter	AW520A
	NOTE: Please visit the HP Converged Network Adapter QuickSpecs at: www.hp.com/go/cna for suitable cables and SFPs.		
Optical Cables	PremierFlex OM3+ type cables		
		0.5m PremierFlex LC/LC Multi-Mode Optical Cable	BK837A
		1m PremierFlex LC/LC Multi-Mode Optical Cable	BK838A
		2m PremierFlex LC/LC Multi-Mode Optical Cable	BK839A
		5m PremierFlex LC/LC Multi-Mode Optical Cable	BK840A
		1.5m PremierFlex LC/LC Multi-Mode Optical Cable	BK841A



Configuration Information

30m PremierFlex LC/LC Multi-Mode Optical Cable	BK842A
50m PremierFlex LC/LC Multi-Mode Optical Cable	BK843A
OM3 Cables Used with 10GbE SFP+ Optics	
.5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ833A
1 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ834A
2 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ835A
5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ836A
15 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ837A
30 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ838A
50 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ839A
LC-LC for between two 4Gb devices	
2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27
Twinax Copper Cables between 10GbE In the Rack devices	
HP 3m C-series Passive Copper SFP+ Cable	AP784A
HP 5m C-series Passive Copper SFP+ Cable	AP785A
HP 7m C-series Active Copper SFP+ Cable	QK701A
HP 10m C-series Active Copper SFP+ Cable	QK702A

Step 4 - Installation Service Option

<http://www.hp.com/hps/support>

Installation Service Product # HA113A1

For more information on HP SAN switches, contact any of our worldwide sales offices or visit our Web site at:

<http://www.hp.com/go/san>.



Technical Specifications

Layer 2 Features	<ul style="list-style-type: none">● Layer 2 switch ports and VLAN trunks● IEEE 802.1Q VLAN encapsulation● Support for up to 512 VLANs and virtual SANs (VSANs) per switch● Rapid Per-VLAN Spanning Tree Plus (PVRST+)● Multiple Spanning Tree Protocol (MSTP) (IEEE 802.1s): 64 instances● Spanning Tree PortFast and PortFast Guard● Spanning Tree UplinkFast and BackboneFast● Spanning Tree Root Guard● Spanning Tree Bridge Assurance● NIC teaming● Internet Group Management Protocol (IGMP) Versions 1, 2, and 3 snooping● IGMP snooping querier● Protocol Independent Multicast (PIM) snooping (future)● Cisco EtherChannel technology● Link Aggregation Control Protocol (LACP): IEEE 802.3ad● Advanced PortChannel hashing based on Layer 2, 3, and 4 information● Virtual PortChannels (VPCs) (future)● Jumbo frames on all ports (up to 9216 bytes)● Pause frames (IEEE 802.3x)● Storm control (unicast, multicast, and broadcast)● Private VLANs● Private VLAN over trunks
Fibre Channel Features (Requires Storage Services License)	<ul style="list-style-type: none">● FCoE● Fibre Channel Protocol (FCP)● Fibre Channel standard port types: E, F, and NP● Fibre Channel enhanced port types: TE and VF● Up to 64 buffer credits per port● VSANs● Fibre Channel (SAN) PortChannel● VSAN trunking● Fabric Device Management Interface (FDMI)● Fibre Channel ID (FCID) persistence● Dynamic port VSAN membership (future)● Distributed device alias services● In-order delivery● Port tracking● N-port virtualization (NPV)● N-port identifier virtualization (NPIV)● QoS: 2 levels (future)● Fabric services: Name server, registered state change notification (RSCN), login services, and name-server zoning● Per-VSAN fabric services● Cisco Fabric Services● Diffie-Hellman Challenge Handshake Authentication Protocol (DHCHAP) and Fibre Channel Security Protocol (FC-SP)● Distributing device alias services● Host-to-switch and switch-to-switch FC-SP authentication● Fabric Shortest Path First (FSPF)● Fabric binding for Fibre Channel● Standard zoning



Technical Specifications

	<ul style="list-style-type: none"> • Port security • Domain and port • Enhanced zoning • SAN PortChannels • Cisco Fabric Analyzer • Automatic failure detection and restart of applications (future) • Fibre Channel traceroute • Fibre Channel ping • Fibre Channel debugging
Diagnostics	<ul style="list-style-type: none"> • Generic Online diagnostics
Security	<ul style="list-style-type: none"> • Ingress access control lists (ACLs) (standard and extended) on Ethernet and virtual Ethernet ports • Standard and extended Layer 2 ACLs: MAC addresses, protocol type, etc. • Standard and extended Layer 3 to 4 ACLs: IPv4 and v6, Internet Control Message Protocol (ICMP), TCP, User Datagram Protocol (UDP), etc. • VLAN-based ACLs (VACLs) • Port-based ACLs (PACLs) • Named ACLs • ACL logging and statistics • Time-based ACLs • Optimized ACL distribution • IEEE 802.1X (future) • Port security (future) • Cisco TrustSec (future)
Quality of Service	<ul style="list-style-type: none"> • Layer 2 IEEE 802.1p (CoS) • 8 hardware queues per port • Per-port QoS configuration • CoS trust • Modular QoS CLI (MQC) compliance • Color-aware aggregate policing • Policed drop • Per-port Virtual Output Queuing • CoS-based egress queuing • Egress strict-priority queuing • Egress port-based scheduling: Weighted Round-Robin (WRR) • Ingress policing on physical Ethernet and virtual Ethernet interfaces • Delayed drop (future)
Management	<ul style="list-style-type: none"> • Switch management using 10/100/1000-Mbps management or console ports • CLI-based console to provide detailed out-of-band management • SSHv2 • Telnet • AAA • RADIUS • TACACS+ • Syslog • Embedded packet analyzer • SNMP v1, v2, and v3 • Enhanced SNMP MIB support • XML (NETCONF) support • Remote monitoring (RMON) • Advanced Encryption Standard (AES) for management traffic • Unified username and passwords across CLI and SNMP



Technical Specifications

	<ul style="list-style-type: none"> ● Microsoft Challenge Handshake Authentication Protocol (CHAP) ● Digital certificates for management between switch and RADIUS server ● Cisco Discovery Protocol (CDP) Versions 1 and 2 ● RBAC ● Switched Port Analyzer (SPAN) on physical, PortChannel, VLAN, and Fibre Channel interfaces ● Enhanced Remote SPAN (ERSPAN) (future) ● Ingress and egress packet counters per interface ● Network Time Protocol (NTP) ● Power-on self-test (POST) ● Cisco GOLD: Ethernet and Fibre Channel ● Comprehensive bootup diagnostic tests ● HP Call Home ● Smart Call Home ● Cisco Fabric Manager ● Cisco DCNM ● Cisco Vframe ● CiscoWorks LMS Portal 		
Availability Features	<ul style="list-style-type: none"> ● Hot-swappable field-replaceable power supplies, fan modules, and expansion modules ● 1:1 power redundancy ● N:1 fan module redundancy 		
IEEE DCB	<ul style="list-style-type: none"> ● PFC (per-priority pause frame support) ● DCBX Protocol ● IEEE 802.1Qaz: Bandwidth management ● IEEE 802.1Qau: Congestion management (BCN) (future) ● Layer 2 multipathing (future) 		
Compatibility	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Fibre Channel Standards</td> <td> <ul style="list-style-type: none"> ● FC-PH, Revision 4.3 (ANSI/INCITS 230-1994) ● FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1 1996) ● FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999) ● FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997) ● FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998) ● FC-PI, Revision 13 (ANSI/INCITS 352-2002) ● FC-PI-2, Revision 10 (ANSI/INCITS 404-2006) ● FC-PI-4, Revision 7.0 ● FC-FS, Revision 1.9 (ANSI/INCITS 373-2003) ● FC-FS-2, Revision 0.91 ● FC-LS, Revision 1.2 ● FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001) ● FC-SW-3, Revision 6.6 (ANSI/INCITS 384-2004) ● FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001) ● FC-GS-4, Revision 7.91 (ANSI/INCITS 387-2004) ● FC-BB-5, Revision 1.0 for FCoE ● FCP, Revision 12 (ANSI/INCITS 269-1996) ● FCP-2, Revision 8 (ANSI/INCITS 350-2003) ● FCP-3, Revision 4 (ANSI/INCITS 416-2006) ● FC-MI, Revision 1.92 (INCITS TR-30-2002, except for FL_ports and Class 2) ● FC-MI-2, Revision 2.6 (INCITS TR-39-2005, except for FL_ports and Class 2) ● FC-SP, Revision 1.6 ● FC-DA, Revision 3.1 (INCITS TR-36-2004, except for FL_ports, SB ports and Class 2) </td> </tr> </table>	Fibre Channel Standards	<ul style="list-style-type: none"> ● FC-PH, Revision 4.3 (ANSI/INCITS 230-1994) ● FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1 1996) ● FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999) ● FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997) ● FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998) ● FC-PI, Revision 13 (ANSI/INCITS 352-2002) ● FC-PI-2, Revision 10 (ANSI/INCITS 404-2006) ● FC-PI-4, Revision 7.0 ● FC-FS, Revision 1.9 (ANSI/INCITS 373-2003) ● FC-FS-2, Revision 0.91 ● FC-LS, Revision 1.2 ● FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001) ● FC-SW-3, Revision 6.6 (ANSI/INCITS 384-2004) ● FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001) ● FC-GS-4, Revision 7.91 (ANSI/INCITS 387-2004) ● FC-BB-5, Revision 1.0 for FCoE ● FCP, Revision 12 (ANSI/INCITS 269-1996) ● FCP-2, Revision 8 (ANSI/INCITS 350-2003) ● FCP-3, Revision 4 (ANSI/INCITS 416-2006) ● FC-MI, Revision 1.92 (INCITS TR-30-2002, except for FL_ports and Class 2) ● FC-MI-2, Revision 2.6 (INCITS TR-39-2005, except for FL_ports and Class 2) ● FC-SP, Revision 1.6 ● FC-DA, Revision 3.1 (INCITS TR-36-2004, except for FL_ports, SB ports and Class 2)
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		<ul style="list-style-type: none"> • Class of Service: Class 3, Class F • Fibre Channel standard port types: E, F • Fibre Channel enhanced port types: SD, TE
	Industry Standards	<ul style="list-style-type: none"> • IEEE 802.1D: Spanning Tree Protocol • IEEE 802.1p: CoS prioritization • IEEE 802.1Q: VLAN tagging • IEEE 802.1s: Multiple VLAN instances of Spanning Tree Protocol • IEEE 802.1w: Rapid reconfiguration of Spanning Tree Protocol • IEEE 802.1ae: Media Access Control (MAC) Security (future) • IEEE 802.3: Ethernet • IEEE 802.3ad: LACP • IEEE 802.3ae: 10 Gigabit Ethernet • SFP+ support • RMON
	O/S Support	NX-OS 4.1(1a)N1(1) or higher
SNMP MIBs	Generic MIBs	<ul style="list-style-type: none"> • SNMPv2-SMI • CISCO-SMI • SNMPv2-TM • SNMPv2-TC • IANA-ADDRESS-FAMILY-NUMBERS-MIB • IANAifType-MIB • IANAiprouteprotocol-MIB • HCNUM-TC • CISCO-TC • SNMPv2-MIB • SNMP-COMMUNITY-MIB • SNMP-FRAMEWORK-MIB • SNMP-NOTIFICATION-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMP-VIEW-BASED-ACM-MIB • CISCO-SNMP-VACM-EXT-MIB
	Fibre Channel MIBs	<ul style="list-style-type: none"> • CISCO-ST-TC • CISCO-FC-FE-MIB • CISCO-FCSP-MIB • CISCO-PORT-TRACK-MIB • CISCO-PSM-MIB • CISCO-FC-SPAN-MIB • CISCO-PORT-CHANNEL-MIB • CISCO-RSCN-MIB • CISCO-NS-MIB • CISCO-FCS-MIB • CISCO-DM-MIB • FIBRE-CHANNEL-FE-MIB • CISCO-FC-ROUTE-MIB • CISCO-FSPF-MIB • CISCO-ZS-MIB • CISCO-ZS-EXT-MIB • CISCO-VSAN-MIB • CISCO-CFS-MIB • CISCO-FCPING-MIB



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	<ul style="list-style-type: none"> ● CISCO-FCTRACEROUTE-MIB ● CISCO-FDMI-MIB ● CISCO-FC-DEVICE-ALIAS-MIB ● CISCO-WWNMGR-MIB ● FCMGMT-MIB ● CISCO-VEDM-MIB
Ethernet MIB	<ul style="list-style-type: none"> ● CISCO-VLAN-MEMBERSHIP-MIB
Configuration MIBs	<ul style="list-style-type: none"> ● ENTITY-MIB ● IF-MIB ● CISCO-ENTITY-EXT-MIB ● CISCO-ENTITY-FRU-CONTROL-MIB ● CISCO-ENTITY-SENSOR-MIB ● CISCO-FLASH-MIB ● CISCO-SYSTEM-MIB ● CISCO-SYSTEM-EXT-MIB ● CISCO-IP-IF-MIB ● CISCO-IF-EXTENSION-MIB ● CISCO-SERVER-INTERFACE-MIB ● CISCO-NTP-MIB ● CISCO-IMAGE-MIB ● CISCO-IMAGE-CHECK-MIB ● CISCO-IMAGE-UPGRADE-MIB ● CISCO-CONFIG-COPY-MIB ● CISCO-ENTITY-VENDORTYPE-OID-MIB
Monitoring MIBs	<ul style="list-style-type: none"> ● DIFFSERV-DSCP-TC ● NOTIFICATION-LOG-MIB ● DIFFSERV-MIB ● CISCO-CALLHOME-MIB ● CISCO-SYSLOG-EXT-MIB ● CISCO-PROCESS-MIB ● RMON-MIB ● CISCO-RMON-CONFIG-MIB ● CISCO-HC-ALARM-MIB
Security MIBs	<ul style="list-style-type: none"> ● CISCO-AAA-SERVER-MIB ● CISCO-AAA-SERVER-EXT-MIB ● CISCO-COMMON-ROLES-MIB ● CISCO-COMMON-MGMT-MIB ● CISCO-RADIUS-MIB ● CISCO-SECURE-SHELL-MIB ● TCP/IP MIBs ● INET-ADDRESS-MIB ● TCP-MIB ● CISCO-TCP-MIB ● UDP-MIB ● IP-MIB ● CISCO-IP-PROTOCOL-FILTER-MIB ● CISCO-DNS-CLIENT-MIB



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	Miscellaneous MIBs	<ul style="list-style-type: none"> ● START-MIB ● CISCO-LICENSE-MGR-MIB ● CISCO-FEATURE-CONTROL-MIB ● CISCO-CDP-MIB ● CISCO-RF-MIB 	
Performance	Transfer Rate	<ul style="list-style-type: none"> ● Nexus 5020: Layer 2 hardware forwarding at 1.04 Tbps or 773.8 million packets per second (mpps) ● Nexus 5010: Layer 2 hardware forwarding at 520 Gbps or 386.9 million packets per second (mpps) ● Low latency cut-through design provides predictable, consistent traffic latency regardless of packet size, traffic pattern, or enabled features 	
	Devices/Ports	<ul style="list-style-type: none"> ● 20 or 40 Fixed 10GbE ports ● Up to 8, 4Gb FC ports (5010), Up to 16, 4Gb FC ports (5020) ● Up to 6, 8Gb FC ports (5010), Up to 12, 8Gb FC ports (5020) ● 2 - 10/100/1000 Mb Ethernet port ● 1 - EIA/TIA-232 serial console port 	
	Interface	<ul style="list-style-type: none"> ● 1/10GbE ports and 1/2/4Gb FC ports ● 2 - 10/100/1000 Mb Ethernet port (management) ● 2 - Ethernet connector with cross-connect port ● 1 - RS-232 RJ-45 console port 	
Dimensions	Dimensions (H x W x D)	Nexus 5010	1.72 x 17.3 x 30.0 in. (4.4 x 43.9 x 76.2 cm)
		Nexus 5020	3.47 x 17.3 x 30.0 in. (8.8 x 43.9 x 76.2 cm)
	Shipping		
	Weight	Nexus 5020 with 2 power supplies, 2 expansion modules and 5 fan module	50 lb (22.68 kg)
		Nexus 5010 with 2 power supplies, 1 expansion module and 2 fan modules	35 lb (15.88 kg)
	Rack	Nexus 5010	1 Rack Unit
Nexus 5020		2 Rack Units	
		All units rack mountable in standard 19 inch EIA rack	
Connectors/Cables	Cable Lengths	OM3: .5 meters, 1 meter, 3 meters, 5 meters, 15 meters, 30 meters, 50 meters LC/LC: 2 meters, 5 meters, 15 meters, 30 meters, 50 meters Copper Twinax: 3 meters, 5 meters with integrated SFP	
	Optical Transceivers	<ul style="list-style-type: none"> ● Small Form Factor Pluggable, Short Wave ● Small Form Factor Pluggable, Long Wave ● Short Reach 10GbE SFP+ 	
Regulatory Compliance	Products should comply with CE Markings according to directives 2004/108/EC and 2006/95/EC.		
RoHS	The product is RoHS 5 compliant with exceptions for leaded ball grid array (BGA) balls and lead press-fit connectors.		
Safety	<ul style="list-style-type: none"> ● UL 60950-1 ● CAN/CSA-C22.2 No. 60950-1 ● EN 60950-1 ● IEC 60950-1 ● AS/NZS 60950-1 ● GB4943 		
EMC	Emissions	<ul style="list-style-type: none"> ● 47CFR Part 15 (CFR 47) Class A 	



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	<ul style="list-style-type: none"> ● AS/NZS CISPR22 Class A ● CISPR22 Class A ● EN55022 Class A ● ICES003 Class A ● VCCI Class A ● EN61000-3-2 ● EN61000-3-3 ● KN22 Class A ● CNS13438 Class A
Immunity	<ul style="list-style-type: none"> ● EN50082-1 ● EN61000-6-1 ● EN55024 ● CISPR24 ● EN300386 ● KN 61000-4 series

Power Supply - Listed below is the properties of the HP C-series, Nexus 5010 Switch and Nexus 5020 Switch

AC Power Supply Properties	Nexus 5010 Switch	Nexus 5020 Switch
Typical Operating Power	350W	480W
Maximum Power	450W	750W
Input Voltage	100-240VAC	100-240VAC
Frequency	50-60Hz	50-60Hz
Efficiency	88-90%	82-88%
RoHS Compliance	Yes	Yes
Hot Swappable	Yes	Yes
Heat Dissipation	1536 BTU/hr	2561 BTU/hr

Environment of the HP C-series, Nexus 5000 Converged Network Switches

Property	Nexus 5010 Switch	Nexus 5020 Switch
Physical (height x width x depth)	1.72 x 17.3 x 30.0 in. (4.4 x 43.9 x 76.2 cm)	3.47 x 17.3 x 30.0 in. (8.8 x 43.9 x 76.2 cm)
Operating Temperature	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)
Humidity	5 to 95% (noncondensing)	5 to 95% (noncondensing)
Altitude	0 to 10,000 ft (0 to 300m)	0 to 10,000 ft (0 to 300m)



Technical Specifications

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