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HPE Networking Comware Switch Series 5520 HI QuickSpecs

The HPE Networking Comware Switch Series 5520 HI delivers superior performance, high availability, and simplified manageability by leveraging advanced features at the access and aggregation layer of medium and large enterprise networks.

These switches deliver faster performance and advanced L3 features with support for larger ARP/MAC tables and Longest Prefix Match (LPM). VXLAN and EVPN enable multitenant isolation and greater scalability; high availability and resiliency provided by Distributed Resilient Network Interconnect (DRNI), Intelligent Resilient Framework (IRF), Virtual Router Redundancy Protocol (VRRP), Equal-Cost Multipath (ECMP) and Bi-directional Forwarding Detection (BFD).

Overview

Real-time network health, network and switch performance and visibility provided with Intelligent Management Center (IMC) and Intelligent Network Quality Analyzer (iNQA). Support for IPv4/IPv6, OpenFlow, and MPLS/VPLS features provides investment protection and eases transition from IPv4 to IPv6 networks.



HPE Networking Comware Switch Series 5520 HI

Key Features

- Advanced features such as larger MAC tables, Longest Prefix Match (LPM) and increased processing enable faster switching.
- DRNI combines multiple physical switches into one virtual distributed-relay (DR) system for doubling aggregate bandwidth, faster forwarding, resiliency, and high availability.
- Intelligent Network Quality Analyzer (iNQA) measures network packet loss performance and provides visibility into real-time application performance and health.
- Advanced L3 features such as Virtual Extensible LAN (VXLAN) and Ethernet VPN (EVPN) allow greater flexibility to integrate into existing networks, better scalability without redesigning the underlay network, enhanced security to restrict attacks, and improved performance specially in spine-leaf architectures.
- Scalable with 10 Gigabit uplinks and 9-chassis IRF with up to 160 GB/s stacking bandwidth
- 4 convenient built-in SFP+ 10GbE uplinks provide performance for bandwidth hungry applications
- PoE+ for up to 30 Watts of PoE power per port on all ports simultaneously
- MACsec support
- New made in USA TAA SKUs introduced for customers who have concerns with 'made in China' products. These SKUs are provide additional security as a combination of manual and automated source code analysis is performed to identify common programming issues and address any security weaknesses.

Overview

Models

HPE Networking Comware Switch 24p 10/100/1000BASE-T 4p SFP+ 1 Exp 2 PS Slot 5520HI	R8M25A
HPE Networking Comware Switch 48G 10/100/1000BASE-T 4 10G/1G BASE-X 5520HI	R8M26A
HPE Networking Comware Switch 24 SFP 4 10G/1G BASE-X SFP+ 1 Exp slot 2 Fan Tray 2 PS 5520HI	R8M27A
HPE Networking Comware Switch 24 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI	R8M28A
HPE Networking Comware Switch 48 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI	R8M29A

Standard Features

Software-defined networking

- **OpenFlow**
  Supports OpenFlow 1.3 specification to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths

Quality of Service (QoS)

- **Advanced classifier based QoS**
  Classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- **VXLAN hardware support**
  VXLAN L2/L3 gateway support for up to 1024 unicast tunnels with 511 VXLAN/per tunnel.
- **EVPN support**
  Used as overlay control plane and provides virtual connectivity between different Layer 2/3 domains over an IP or MPLS network
- **Powerful QoS feature**
  Creates traffic classes based on access control lists (ACLs), IEEE 802.1p precedence, IP, and DSCP or Type of Service (ToS) precedence; supports filter, redirect, mirror, or remark; supports the following congestion actions: strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), weighted random early discard (WRED), weighted deficit round robin (WDRR), SP+WDRR, and SP+WFQ
  Supports IPv6 and fully featured L3 functionality, including RIP, OSPF, ISIS, BGP, and PIM without additional software licensing.
- **Storm restraint and Broadcast control**
  Allows limitations of broadcast, multicast, and unknown unicast traffic rate to reduce unwanted network broadcast traffic

Management

- **Friendly port names**
  Allows assignment of descriptive names to ports
- **sFlow**
  Provides scalable ASIC-based wirespeed network monitoring and accounting with no impact on network performance that allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring
- **Complete session logging**
  Provides detailed information for problem identification and resolution
- **Remote configuration and management**
  Enables configuration and management through a CLI located on a remote device
- **Manager and operator privilege levels**
  Provides read-only (operator) and read/write (manager) access on CLI management interfaces
- **Management VLAN**
  Segments traffic to and from management interfaces, including CLI/Telnet and SNMP
- **Command authorization**
  Leverages RADIUS/HWTACACS to link a custom list of CLI commands to an individual network administrator's login; also provides an audit trail

Standard Features

- **Remote monitoring (RMON)**
  Uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- **Multiple configuration files**
  Stores easily to the flash image
- **Remote intelligent mirroring**
  Mirrors ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network
- **Network Management**
  SNMP v1/v2c/v3, MIB-II with Traps, and RADIUS Authentication Client MIB (RFC 2618); embedded HTML management tool with secure access
- **IPv6 management**
  Provides future-proof networking as the switch is capable of being managed whether the attached network is running IPv4 or IPv6; supports pingv6, tracertv6, Telnetv6, TFTPv6, DNSv6, syslogv6, FTPv6, SNMPv6, DHCPv6, and RADIUS for IPv6
- **Troubleshooting**
  Ingress and egress port monitoring enables network problem-solving; virtual cable tests provide visibility into cable problems
- **HPE Intelligent Management Center (IMC)**
  Integrates fault management, element configuration, and network monitoring from a central vantage point; built-in support for third-party devices enables network administrators to centrally manage all network elements with a variety of automated tasks, including discovery, categorization, baseline configurations, and software images; the software also provides configuration comparison tools, version tracking, change alerts, and more.

Connectivity

- **Auto-MDIX**
  Automatically adjusts for straight-through or crossover cables on all 10/100/1000 ports
- **Packet storm protection**
  Protects against broadcast, multicast, or unicast storms with user-defined thresholds
- **Ethernet operations, administration and maintenance (OAM)**
  Detects data link layer problems that occurred in the "last mile" using the IEEE 802.3ah OAM standard; monitors the status of the link between two devices
- **Flow control**
  Provides back pressure using standard IEEE 802.3x, reducing congestion in heavy traffic situations
- **Fixed 10GbE ports**
  Provides four fixed SFP+ ports for a 20 GbE connection to the network without the need for additional extension interface modules
- **Jumbo packet support**
  Supports up to 10000-byte frame size to improve the performance of large data transfers
- **IEEE 802.3at Power over Ethernet (PoE+)**
  Provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments

Standard Features

Performance

- **Supports Equal-Cost Multipath**
  Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth.
- **Hardware-based wirespeed access control lists (ACLs)**
  Help provide high levels of security and ease of administration without impacting network performance with a feature-rich TCAM-based ACL implementation
- **Intelligent Network Quality Analyser (iNQA)**
  Helps in Advanced packet loss and delay measurement, measures network packet loss performance, forward, reverse, and two-way packet loss, including lost Number of messages and bytes, message loss and byte loss rate
- **Nonblocking architecture**
  Delivers up to 336 Gb/s of wire-speed switching with a nonblocking switching fabric and up to 180 million pps throughput

Virtual Private Network (VPN)

- **Generic Routing Encapsulation (GRE)**
  Transports Layer 2 connectivity over a Layer 3 path in a secured way; enables the segregation of traffic from site to site

Resiliency and High Availability

- **Separate data and control paths**
  Separate control from services and keeps service processing isolated; increases security and performance
- **Distributed Resilient Network Interconnection (DRNI)**
  Enables link aggregation from multiple switches to implement device-level link backup for node redundancy. DRNI also simplifies network topology by virtualizing multiple physical devices into one logical device.
- **Device Link Detection Protocol (DLDP)**
  Monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks
- **Intelligent Resilient Fabric (IRF)**
  Creates virtual resilient switching fabrics, where upto nine switches perform as a single L2 switch and L3 router; switches do not have to be co-located and can be part of a disaster-recovery system; servers or switches can be attached using standard LACP for automatic load balancing and high availability; can eliminate need for complex protocols like Spanning Tree Protocol, Equal-Cost Multipath (ECMP), or VRRP, thereby simplifying network operation
- **Rapid Ring Protection Protocol (RRPP)**
  Connects multiple switches in a high-performance ring using standard Ethernet technology; traffic can be rerouted around the ring in less than 50 ms, reducing the impact on traffic and applications
- **Smart Link**
  Allows under 100ms failover between links
- **Virtual Router Redundancy Protocol (VRRP)**
  Allows groups of two routers to dynamically back each other up to create highly available routed environments

Standard Features

- **IRF Capability**
  Provides single IP address management for a resilient virtual switching fabric of up to nine switches with stacking bandwidth of up to 160 Gbps to enhance performance and reliability with uninterrupted L2 switching and L3 forwarding., It delivers simpler, flatter, and more agile networks by reducing the need for complex protocols.
- **Spanning Tree/PVST+, MSTP, RSTP**
  Provides redundant links while preventing network loops
- **Internal Dual Redundant Power Supply**
  Provides high reliability by keeping network up while delivering up to 1440 Watts of PoE+

Manageability

- **Dual flash images**
  Provides independent primary and secondary operating system files for backup while upgrading
- **Multiple configuration files**
  Allow multiple configuration files to be stored to a flash image
- **Troubleshooting**
  Allows ingress and egress port monitoring, enabling network problem solving; virtual cable tests provide visibility into cable problems
- **IPv6 management**
  Future-proofs networking, as the switch is capable of being managed whether the attached network is running IPv4 or IPv6; supports pingv6, tracertv6, Telnetv6, SSH2 v6 and SFTP v6

Layer 2 Switching

- **IP multicast snooping and data-driven IGMP**
  Automatically prevents flooding of IP multicast traffic
- **Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping**
  Controls and manages the flooding of multicast packets in a Layer 2 network
- **32K MAC addresses**
  Provide access to many Layer 2 devices
- **IEEE 802.1ad QinQ and selective QinQ**
  Increase the scalability of an Ethernet network by providing a hierarchical structure; connect multiple LANs on a high-speed campus or metro network
- **10GbE port aggregation**
  Allows grouping of ports to increase overall data throughput to a remote device
- **Spanning Tree/MSTP, RSTP, and STP root guard**
  Prevent network loops
- **64 MSTP instances**
  Allow multiple configurations of STP per VLAN group
- **Isolation at data link layer with private VLANs**
  Provides, through a two-tier VLAN structure, an additional layer of protection, simplifying network configuration while saving VLAN resources
- **VLAN support and tagging**
  Supports the IEEE 802.1Q (4K VLAN IDs)

Standard Features

Layer 3 Services

- **Longest Prefix Match (LPM)**
  Helps in enabling and scaling multipathing, larger switch route forwarding table, faster destination resolution
- **Address Resolution Protocol (ARP)**
  Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- **Dynamic Host Configuration Protocol (DHCP)**
  Simplifies the management of large IP networks; supports client; DHCP Relay enables DHCP operation across subnets
- **Loopback interface address**
  Defines an address that can always be reachable, improving diagnostic capability
- **User Datagram Protocol (UDP) helper function**
  Allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP
- **Route maps**
  Provide more control during route redistribution; allow filtering and altering of route metrics
- **DHCP server**
  Centralizes and reduces the cost of the IPv4 address management
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Layer 3 Routing

- **IPv4 routing protocols**
  Support static routes, RIP, OSPF, ISIS, and BGP
- **IPv6 routing protocols**
  Provide routing of IPv6 at wire speed; support static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ for IPv6
- **PIM-SSM, PIM-DM, and PIM-SM (for IPv4 and IPv6)**
  Support IP Multicast address management and inhibition of DoS attacks
- **MPLS support**
  Provides extended support of MPLS, including MPLS VPNs and MPLS Traffic Engineering (MPLS TE)
- **Virtual Private LAN Service (VPLS)**
  Establishes point-to-multipoint Layer 2 VPNs across a provider network
- **Bidirectional Forwarding Detection (BFD)**
  Enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF
- **Policy-based routing**
  Makes routing decisions based on policies set by the network administrator
- **Equal-Cost Multipath (ECMP)**
  Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- **IPv6 tunneling**
  Allows a smooth transition from IPv4 to IPv6 by encapsulating IPv6 traffic over an existing IPv4 infrastructure

Standard Features

Security

- **Access control lists (ACLs)**
  Provide IP Layer 2 to Layer 4 traffic filtering; support global ACL, 4K VLAN ACL table size, port ACL, and IPv6 ACL; up to 2K ingress ACLs and 512 egress ACLs are supported
- **IEEE 802.1X**
  Defines an industry-standard method of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server
- **MACsec encryption**
  - Secures connected devices by establishing bi-directional encrypted links after an exchange and verification of security keys. Increased demand for PoE connected devices and a dramatic growth in sophistication and frequency of cyber security threats makes this feature highly relevant
  - Supports IPSec VPN for secure communications at the network layer
- **MAC-based authentication**
  Client is authenticated with the RADIUS server based on the client's MAC address
- **Identity-driven security and access control**
  - **Per-user ACLs**
    Permits or denies user access to specific network resources based on user identity and time of day, allowing multiple types of users on the same network to access specific network services without risking network security or providing unauthorized access to sensitive data
  - **Automatic VLAN assignment**
    Automatically assigns users to the appropriate VLAN based on their identities
- **Port security**
  Allows access only to specified MAC addresses, which can be learned or specified by the administrator
- **Secure FTP/ SCP**
  Allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- **STP BPDU port protection**
  Blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- **DHCP protection**
  Blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- **DHCP snooping**
  Helps ensure that DHCP clients receive IP addresses from authorized DHCP servers and maintain a list of DHCP entries for trusted ports; prevents reception of fake IP addresses and reduces ARP attacks, improving security
- **DHCPv6 snooping**
  Ensures that DHCPv6 clients obtain IPv6 addresses from authorized DHCPv6 servers and record IP-to-MAC mappings of DHCPv6 clients
- **Dynamic ARP protection**
  Blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- **STP root guard**
  Protects the root bridge from malicious attacks or configuration mistakes
- **Guest VLAN**
  Provides a browser-based environment to authenticated clients similar to IEEE 802.1X
- **Port isolation**
  Secures and adds privacy, and prevents malicious attackers from obtaining user information
- **Endpoint Admission Defense (EAD)**
  Provides security policies to users accessing a network

Standard Features

- **RADIUS/HWTACACS**
  Eases switch management security administration by using a password authentication server
- **Simplified and Secure Management**
  Management access is provided via CLI, SNMP, Netconf, Yang and RestAPIs
- **Unicast Reverse Path Forwarding (URPF)**
  Allows normal packets to be forwarded correctly, but discards the attaching packet due to lack of reverse path route or incorrect inbound interface; prevents source spoofing and distributed attacks; supports distributed URPF
- **IP source guard**
  Helps prevent IP spoofing attacks
- **IPv6 source guard**
  Help prevent IPv6 spoofing attacks using ND Snooping as well as DHCPv6 Snooping
- **ND Snooping**
  Allows only packets with a legally obtained IPv6 address to pass

Convergence

- **LLDP-MED (Media Endpoint Discovery)**
  Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- **Internet Group Management Protocol (IGMP)**
  Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3
- **IEEE 802.1AB Link Layer Discovery Protocol (LLDP)**
  Facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- **Multicast Source Discovery Protocol (MSDP)**
  Allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications
- **Multicast VLAN**
  Allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, lessening network bandwidth demand by reducing or eliminating multiple streams to each VLAN
- **Link Layer Discovery Protocol (LLDP)**
  It is vendor-neutral and enables the use of heterogenous network devices by advertising their identity, capabilities, and neighbors on a local area network based on IEEE 802 technology
- **IEEE 802.3at Power over Ethernet (PoE+)**
  Provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- **PoE allocations**
  Supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings

Standard Features

- **Voice VLAN**
  Automatically assigns VLAN and priority for IP phones, simplifying network configuration and maintenance
- **IP multicast snooping (data-driven IGMP)**
  Prevents flooding of IP multicast traffic

Additional Information

- **Green IT and power**
  Improves energy efficiency through the use of the latest advances in silicon development; shuts off unused ports and utilizes variable-speed fans, reducing energy costs
- **Unified Hewlett Packard Enterprise Comware operating system with modular architecture**
  Provides an easy-to-enhance-and-extend feature set, which doesn't require whole-scale changes; all switching, routing, and security platforms leverage the Comware OS, a common unified modular operating system
- **Energy Efficient Ethernet (EEE) support**
  Reduces power consumption in accordance with IEEE 802.3az

Warranty and support

- **Limited Lifetime Warranty**
  See Warranty and Support summary for details on what is included with your product purchase.
- **Software releases**
  To find software for your product, refer to http://www.hpe.com/networking/support; for details on the software releases available with your product purchase, refer to Warranty and Support summary.

Configuration Information

BTO Models

Switch Chassis

Description	SKU
HPE Networking Comware Switch 24p 10/100/1000BASE-T 4p SFP+ 1 Exp 2 PS Slot 5520HI	R8M25A
HPE Networking Comware Switch 48G 10/100/1000BASE-T 4 10G/1G BASE-X 5520HI	R8M26A
HPE Networking Comware Switch 24 SFP 4 10G/1G BASE-X SFP+ 1 Exp slot 2 Fan Tray 2 PS 5520HI	R8M27A
HPE Networking Comware Switch 24 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI	R8M28A
HPE Networking Comware Switch 48 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI	R8M29A

TAA Switch Chassis

HPE Networking Comware Switch 24p 10/100/1000BASE-T 4p SFP+ 1G/10G 1-slot 2xFan 2xPSU TAA 5520HI	S3K91A
HPE Networking Comware Switch 48p 10/100/1000BASE-T 4p SFP+ 1G/10G 1-slot 2xFan 2xPSU TAA 5520HI	S3K92A
HPE Networking Comware Switch 24p SFP 1G 4p SFP+ 1G/10G 1-slot 2xFan 2xPSU TAA 5520HI	S3K93A

Configuration Information

Rack Level Integration CTO Models

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HPE Networking Comware Switch 24p SFP 1G 4p SFP+ 1G/10G 1-slot 2xFan 2xPSU TAA 5520HI	S3K93A

Modules

Description	SKU
HPE Networking Comware Module 2-port 40G QSFP+ 5520HI/5600HI	JH155A
HPE Networking Comware Module 2p 10GBASE-T MACsec 5140/5520	R9L65A
HPE Networking Comware Module 10GbE SFP+MACsec128 2p 5140HI/5520HI	JH157A
HPE Networking Comware Module 4-port 10/100/1000Base-T 6-port SFP (2P Combo) 5140HI/5520HI/5600HI	S0T02A
HPE Networking Comware Module 8 Port SFP+ 5520HI/5600HI	S0T03A
HPE Networking Comware Module 4-port 1/10G SFP+ 5140HI/5520HI/5600HI	S0T04A
HPE Networking Comware Module 8-port 1/2.5/5/10GBASE-T 5140HI/5520HI/5600HI	S0T05A
HPE Networking Comware Module 2-port SFP28 5140HI/5520HI/5600HI	S0T06A
HPE Networking Comware Module MACsec 8p SFP+ 1G/10G 5XX0HI	S6C30A[1]

[1]MACsec-enabled Port can’t use as an IRF physical interface, all ports on S6C30A module can’t be used as IRF physical interface regardless of whether MACsec is enabled on these ports

Transceivers

FE Transceivers

Description	SKU
HPE Networking X115 100M SFP LC BX 10-D Transceiver	JD101A
HPE Networking X115 100M SFP LC BX 10-U Transceiver	JD100A
HPE Networking X115 100M SFP LC FX Transceiver	JD102B
HPE Networking X110 100M SFP LC LX Transceiver	JD120B

Configuration Information

SFP Transceivers

Description	SKU
HPE Networking X120 1G SFP RJ45 T Transceiver	JD089B
HPE Networking X120 1G SFP LC SX Transceiver	JD118B
HPE Networking X120 1G SFP LC LX Transceiver	JD119B
HPE Networking X120 1G SFP LC BX 10-U Transceiver	JD098B
HPE Networking X120 1G SFP LC BX 10-D Transceiver	JD099B
HPE Networking X120 1G SFP LC LH100 Transceiver	JD103A

SFP+ Transceivers

Description	SKU
HPE Networking X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	JL740A
HPE Networking X130 10G SFP+ LC ER 40km Transceiver	JG234A
HPE Networking X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	JL739A
HPE Networking X130 10G SFP+ LC LH 80km Transceiver	JG915A
HPE Networking X130 10G SFP+ LC SR Transceiver	JD092B
HPE Networking X130 10G SFP+ LC LR Transceiver	JD094B
HPE Networking X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	JL737A
HPE Networking X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	JL738A

SFP+ Transceiver Cables

Description	SKU
HPE Networking X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C
HPE Networking X240 10G SFP+ SFP+ 1.2m DAC Cable	JD096C
HPE Networking X240 10G SFP+ SFP+ 3m DAC Cable	JD097C
HPE Networking X240 10G SFP+ SFP+ 5m DAC Cable	JG081C
HPE Networking X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
HPE Networking X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
HPE Networking X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A

SFP28 Transceiver

HPE Networking X190 25G SFP28 LC SR 100m MM Transceiver	JL293A
HPE Networking 25G SFP28 LC LR 10km SMF Transceiver	JL855A

SFP28 Transceiver Cables

HPE Networking X240 25G SFP28 to SFP28 1m DAC Cable	JL294A
HPE Networking X240 25G SFP28 to SFP28 3m DAC Cable	JL295A
HPE Networking X240 25G SFP28 to SFP28 5m DAC Cable	JL296A
HPE Networking X2A0 25G SFP28 to SFP28 3m Active Optical Cable	JH955A
HPE Networking X2A0 25G SFP28 to SFP28 5m Active Optical Cable	JH956A

Configuration Information

QSFP+ Transceivers

Description	SKU
HPE Networking X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
HPE Networking X140 40G QSFP+ CSR4 300m Transceiver	JG709A
HPE Networking X140 40G QSFP+ MPO SR4 Transceiver	JG325B
HPE Networking X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
HPE Networking X140 40G QSFP+ LC LR4L 2km SM Transceiver	JL286A

QSFP+ Transceiver Cables

Description	SKU
HPE Networking Comware X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
HPE Networking Comware X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
HPE Networking Comware X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
HPE Networking Comware X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A

Internal Power Supplies

Description	SKU
HPE Networking X361 150W 48-60VDC to 12VDC Power Supply	JD366B
HPE Networking X361 150W 100-240VAC to 12VDC Power Supply	JD362B
HPE X361 150W 100-240VAC to 12VDC Power Supply PDU NA, JP or TW	JD362B#B2B
HPE X361 150W 100-240VAC to 12VDC Power Supply PDU ROW	JD362B#B2C
HPE X361 150W 100-240VAC to 12VDC Power Supply United States 220 volt	JD362B#B2E
HPE X361 150W 100-240VAC to 12VDC Power Supply	JD362B#AC3
HPE Networking X362 720W 100-240VAC to 56VDC PoE Power Supply	JG544A
HPE Networking X362 720W 100-240VAC to 56VDC PoE Power Supply PDU	JG544A#B2B
HPE Networking X362 720W 100-240VAC to 56VDC PoE Power Supply PDU	JG544A#B2C
HPE Networking X362 720W 100-240VAC to 56VDC PoE Power Supply 220v	JG544A#B2E
HPE Networking X362 1110W 115-240VAC to 56VDC PoE Power Supply	JG545A
HPE Networking X362 1110W 115-240VAC to 56VDC PoE Power Supply PDU	JG545A#B2B
HPE Networking X362 1110W 115-240VAC to 56VDC PoE Power Supply PDU	JG545A#B2C
HPE Networking X362 1110W 115-240VAC to 56VDC PoE Power Supply 220v	JG545A#B2E

Technical Specifications

HPE Networking Comware Switch 24p 10/100/1000BASE-T 4p SFP+ 1 Exp 2 PS Slot 5520HI (R8M25A)		
I/O ports and slots	(16) 10/100/1000BASE-T RJ-45 ports (8) dual-personality ports - 10/100/1000BASE-T RJ-45 or 100/1000BASE-X Combo Ports Duplex: Ports 1-24 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); Ports 17-24 support MACsec 4 SFP+ 1/10GbE ports 1 port expansion module slot	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) serial console port	
	1 RJ-45 out-of-band management port	
	1 USB 2.0	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	Airflow direction is Side to Back and Back to Side	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (44.00 x 36.00 x 4.36 cm) (1U height)
	Weight	≤ 6.7 kg shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 180 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	up to 64K, recommended 32K
Environment	**Operating temperature**	23°F to 113°F (-5°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 53 dB, High-speed fan: 68.9 dB; ISO 7779

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Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	Ranges from 81 BTU/hr to 324 BTU/hr depending on power supply configuration
	Voltage	90 VAC to 264 VAC -36 VDC to -72 VDC
	Current **Maximum power rating**	2A 150W
	Idle power	24 W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated – DC maximum input current is 6A	
Safety	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at http://www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

HPE Networking Comware Switch 48G 10/100/1000BASE-T 4 10G/1G BASE-X 5520HI (R8M26A)

I/O ports and slots	48 RJ-45 autosensing 10/100/1000 ports; Duplex: ports 1-48 support 10BASE-T/100BASE-TX, 1000BASE-T (full only) Ports 41-48 support MACsec 4 SFP+ 1/10GbE ports 1 port expansion module slot
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) serial console port
	1 RJ-45 out-of-band management port
	1 USB 2.0
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)

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Fan tray	Airflow direction is Side to Back and Back to Side	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (44.0 x 36.0 x 4.36 cm) (1U height)
	Weight	≤7 kg
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 180 Mpps
	Routing/Switching capacity	336 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	up to 64K, recommended 32K
Environment	**Operating temperature**	23°F to 113°F (-5°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 49.2 dB, High-speed fan: 68.9 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	Ranges from 81 BTU/hr to 327 BTU/hr depending on power supply configuration
	Voltage	90 VAC to 264 VAC -36 VDC to -72 VDC
	Current **Maximum power rating**	2A 150 W
	Idle power	27 W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated – DC maximum input current is 6A	
Safety	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	

Technical Specifications

Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at http://www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

HPE Networking Comware Switch 24 SFP 4 10G/1G BASE-X SFP+ 1 Exp slot 2 Fan Tray 2 PS 5520HI (R8M27A)

I/O ports and slots	(16) SFP 100/1000 Mbps ports (8) SFP dual-personality ports - 10/100/1000BASE-T RJ-45 or 100/1000BASE-X Combo Ports. Ports 17-24 support MACsec 4 SFP+ 1/10GbE ports 1 port expansion module slot	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) serial console port	
	1 RJ-45 out-of-band management port	
	1 USB 2.0	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	Airflow direction is Side to Back and Back to Side	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (43.99 x 36 x 4.37 cm) (1U height)
	Weight	≤6.6kg shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 180 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	up to 64K, recommended 32K

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Environment	**Operating temperature**	23°F to 113°F (-5°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 53 dB, High-speed fan: 68.9 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	Ranges from 81 BTU/hr to 416 BTU/hr depending on power supply configuration
	Voltage	90 VAC to 264 VAC -36 VDC to -72 VDC
	Current **Maximum power rating**	2A 150 W
	Idle power	24W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated – DC maximum input current is 6A	
Safety	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at http://www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

Technical Specifications

HPE Networking Comware Switch 24 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI (R8M28A)		
I/O ports and slots	24 RJ-45 autosensing 10/100/1000 BASE-T PoE+ ports; Duplex: Ports 1-24 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); Ports 17-24 support MACsec 4 SFP+ 10GbE ports 1 port expansion module slot	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) serial console port	
	1 RJ-45 out-of-band management port	
	1 USB 2.0	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	Airflow direction is Side to Back and Back to Side	
Physical characteristics	**Dimensions**	17.32(w) x 18.11(d) x 1.72(h) in (44 x 46 x 4.37 cm) (1U height)
	Weight	≤9.2kg
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 180 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	up to 64K, recommended 32K
Environment	**Operating temperature**	23°F to 113°F (-5°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 57.2 dB, High-speed fan: 68.7 dB; ISO 7779

Technical Specifications

Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	Ranges from 105 BTU/hr to 3166 BTU/hr depending on power supply configuration
	Voltage **Current**	90 VAC to 264 VAC -36 VDC to -72 VDC 3A
	Maximum power rating	1110 W
	Idle power **PoE+ power**	31 W 720 W PoE+
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. – PoE+ power range is from 360W to 720W. PoE+ power is the power supplied by the internal power supply(ies). It is dependent on the type and quantity of power supplies. Device supports 1 or 2 internal modular power supplies. – DC maximum Input Current is 6A. Voltage range for power modules- PSR360-56A: 6-3A, PSR720-56A:10-5A, PSR1110-56A: 12-6A	
Safety	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at http://www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

Technical Specifications

HPE Networking Comware Switch 48 10/100/1000BASE-T 4 10G/1G BASE-X SFP+ 1 Exp 2 Fan Tray 2 PS 5520HI (R8M29A)		
I/O ports and slots	48 RJ-45 autosensing 10/100/1000 BASE-T (PoE+ ports); Duplex: Ports 1-48 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); Ports 41-48 support MACsec 4 SFP+ 10GbE ports; 1 port expansion module slot	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) serial console port	
	1 RJ-45 out-of-band management port	
	1 USB 2.0	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	Airflow direction is Side to Back and Back to Side	
Physical characteristics	**Dimensions**	17.32(w) x 18.11(d) x 1.72(h) in (44x 46 x 4.37 cm) (1U height)
	Weight	≤9.6kg
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 180 Mpps
	Routing/Switching capacity	336 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	up to 64K, recommended 32K
Environment	**Operating temperature**	23°F to 113°F (-5°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 57.2 dB, High-speed fan: 68.7 dB; ISO 7779

Technical Specifications

Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	Ranges from 112 BTU/hr to 5943 BTU/hr depending on power supply configuration
	Voltage	90 VAC to 264 VAC -36 VDC to -72 VDC
	Current	3A
	Maximum power rating	1110 W
	Idle power	33 W
	PoE power	1440 W PoE+
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. – PoE+ power range is from 450W to 1440W. PoE+ power is the power supplied by the internal power supply(ies). It is dependent on the type and quantity of power supplies. Device supports 1 or 2 internal modular power supplies. – DC maximum Input Current is 6A. Voltage range for power modules- PSR360-56A: 6-3A, PSR720-56A:10-5A, PSR1110-56A: 12-6A	
Safety	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at http://www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

Standards and Protocols (applies to all products in series)

BGP

- RFC 1657 Definitions of Managed Objects for BGPv4
- RFC 1771 BGPv4
- RFC 2385 BGP Session Protection via TCP MD5
- RFC 2858 BGP-4 Multi-Protocol Extensions

Device Management

- RFC 1155 Structure and Mgmt Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1305 NTPv3
- RFC 2573 (SNMPv3 Applications)
- RFC 2578-2580 SMIv2
- RFC 2819 (RMON groups Alarm, Event, History and Statistics only)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and telnet management
- Multiple Configuration Files
- SNMP v3 and RMON RFC support
- SSHv1/SSHv2 Secure Shell
- TACACS/TACACS+
- Web UI

General Protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1ak Multiple Registration Protocol (MRP) and Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1AE MACsec
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1D MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q (GVRP)
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1v VLAN classification by Protocol and Port
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.1X PAE
- IEEE 802.3 Type 10BASE-T
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ac (VLAN Tagging Extension)
- IEEE 802.3ad Link Aggregation (LAG)
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10-Gigabit Ethernet
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at Power over Ethernet Plus
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3i 10BASE-T

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- IEEE 802.3u 100BASE-X
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000BASE-X
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 855 Telnet Option Specification
- RFC 894 IP over Ethernet
- RFC 925 Multi-LAN Address Resolution
- RFC 950 Internet Standard Subnetting Procedure
- RFC 951 BOOTP
- RFC 959 - File Transfer Protocol (FTP)
- RFC 1027 Proxy ARP
- RFC 1042 IP Datagrams
- RFC 1058 RIPv1
- RFC 1071 Computing the Internet Checksum
- RFC 1122 Requirements for Internet Hosts - Communication Layers
- RFC 1123 Requirements for Internet Hosts
- RFC 1141 Incremental updating of the Internet checksum
- RFC 1166 - IP Addresses
- RFC 1191 Path MTU discovery
- RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
- RFC 1256 - ICMP Router Discovery Protocol (IRDP)
- RFC 1305 NTPv3
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1533 DHCP Options and BOOTP Vendor Extensions
- RFC 1542 BOOTP Extensions
- RFC 1591 DNS (client only)
- RFC 1643 - Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 1723 RIP v2
- RFC 1812 IPv4 Routing
- RFC 1866 Hypertext Markup Language - 2.0
- RFC 1887 An Architecture for IPv6 Unicast Address Allocation
- RFC 1901 - Introduction to Community-based SNMPv2
- RFC 1902-1907 - SNMPv2
- RFC 2131 DHCP
- RFC 2236 IGMP Snooping
- RFC 2338 VRRP
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2462 IPv6 Stateless Address Autoconfiguration
- RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers

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- RFC 2475 Architecture for Differentiated Services
- RFC 2597 Assured Forwarding PHB Group
- RFC 2616 Hypertext Transfer Protocol -- HTTP/1.1
- RFC 2644 Directed Broadcast Control
- RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 2668 Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
- RFC 2711 IPv6 Router Alert Option
- RFC 2784 Generic Routing Encapsulation (GRE)
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2866 RADIUS Accounting
- RFC 2868 RADIUS Attributes for Tunnel Protocol Support
- RFC 3046 - DHCP Relay Agent Information Option
- RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels
- RFC 3246 Expedited Forwarding PHB
- RFC 3410 Applicability Statements for SNMP
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3416 Protocol Operations for SNMP
- RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3484 Default Address Selection for Internet Protocol version 6 (IPv6)
- RFC 3493 Basic Socket Interface Extensions for IPv6
- RFC 3542 Advanced Sockets Application Program Interface (API) for IPv6
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 3580 - IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3596 DNS Extensions to Support IP Version 6
- RFC 3623 Graceful OSPF Restart
- RFC 3704 Unicast Reverse Path Forwarding (URPF)
- RFC 3768 Virtual Router Redundancy Protocol (VRRP)
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
- RFC 4090 Fast Reroute Extensions to RSVP-TE for LSP Tunnels
- RFC 4113 Management Information Base for the User Datagram Protocol (UDP)
- RFC 4213 Basic IPv6 Transition Mechanisms
- RFC 4250 The Secure Shell (SSH) Protocol Assigned Numbers
- RFC 4251 The Secure Shell (SSH) Protocol Architecture
- RFC 4252 The Secure Shell (SSH) Authentication Protocol
- RFC 4253 The Secure Shell (SSH) Transport Layer Protocol
- RFC 4254 The Secure Shell (SSH) Connection Protocol
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4443 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4575 A Session Initiation Protocol (SIP) Event Package for Conference State
- RFC 4594 Configuration Guidelines for DiffServ Service Classes

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- RFC 4675 RADIUS VLAN & Priority
- RFC 4750 OSPF Version 2 Management Information Base
- RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- 802.1r - GARP Proprietary Attribute Registration Protocol (GPRP)

IP Multicast

- RFC 1112 IGMPv1
- RFC 2236 IGMPv2
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 3376 IGMPv3
- RFC 3569 An Overview of Source-Specific Multicast (SSM)
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 3973 PIM Dense Mode
- RFC 4601 PIM Sparse Mode

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2460 IPv6 Specification
- RFC 2461 IPv6 Neighbor Discovery
- RFC 2463 ICMPv6
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2545 Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 3162 RADIUS and IPv6
- RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses
- RFC 3307 IPv6 Multicast Address Allocation
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3736 Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4443 ICMPv6
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 6724 Default Address Selection for Internet Protocol Version 6 (IPv6)

MIBs

- RFC 1212 Concise MIB Definitions
- RFC 1213 MIB II
- RFC 1215 A Convention for Defining Traps for use with the SNMP
- RFC 1493 Bridge MIB
- RFC 1757 Remote Network Monitoring MIB
- RFC 2096 IP Forwarding Table MIB
- RFC 2233 Interface MIB
- RFC 2571 SNMP Framework MIB
- RFC 2572 SNMP-MPD MIB

Technical Specifications

- RFC 2573 SNMP-Notification MIB
- RFC 2573 SNMP-Target MIB
- RFC 2574 SNMP USM MIB
- RFC 2618 RADIUS Authentication Client MIB
- RFC 2620 RADIUS Accounting Client MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions
- RFC 2737 Entity MIB (Version 2)
- RFC 2819 RMON MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3418 MIB for SNMPv3
- RFC 3621 Power Ethernet MIB

MPLS

- RFC 2961 RSVP Refresh Overhead Reduction Extensions
- RFC 3031 Multiprotocol Label Switching Architecture
- RFC 3032 MPLS Label Stack Encoding
- RFC 3036 LDP Specification
- RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling

Network Management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2818 HTTP over TLS
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 6398 IP Router Alert Considerations and Usage
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3

OSPF

- RFC 1587 OSPF NSSA
- RFC 1850 OSPFv2 Management Information Base (MIB), traps
- RFC 2328 OSPFv2
- RFC 2370 OSPF Opaque LSA Option

QoS/CoS

- RFC 2474 DS Field in the IPv4 and IPv6 Headers
- RFC 3260 New Terminology and Clarifications for DiffServ

Technical Specifications

Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1492 TACACS+
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 3260 New Terminology and Clarifications for DiffServ
- RFC 4716 SSH Public Key File Format
- Secure Sockets Layer (SSL)
- SSHv2 Secure Shell

Summary of Changes

Date	Version History	Action	Description of Change
20-Jul-2026	Version 15	Changed	Internal QS Updates: Survey Text link and portrait brand format update.
16-Feb-2026	Version 14	Changed	Rebranding update applied to QuickSpecs
02-Dec-2024	Version 13	Changed	Configuration Information and Technical Specifications sections were updated.
14-Oct-2024	Version 12	Changed	Configuration Information was updated.
01-Jul-2024	Version 11	Changed	Overview and Configuration Information sections were updated.
04-Dec-2023	Version 10	Changed	Series name was updated.
06-Feb-2023	Version 9	Changed	Configuration Information was updated.
15-Aug-2022	Version 8	Changed	Technical Specifications section was updated.
01-Aug-2022	Version 7	Changed	Configuration Information section was updated.
06-Jun-2022	Version 6	Changed	Standard Features section was updated.
04-Apr-2022	Version 5	Changed	Overview, Standard Features, and Configuration Information sections were updated.
13-Dec-2021	Version 4	Changed	Standard Features section was updated.
18-Oct-2021	Version 3	Changed	Overview and Standard Features sections were updated.
15-Sep-2021	Version 2	Changed	Overview, Configuration Information, and Technical Specifications sections were updated.
07-Sep-2021	Version 1	New	New QuickSpecs

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