JUNIPER NETWORKS

EX3200 ETHERNET SWITCHES

Product Overview

High-performance businesses demand high-performance networking solutions. The Juniper Networks EX3200 line of Ethernet switches offer a compact, high-performance solution for supporting today's converged network access deployments.

Product Description

The EX3200 line of fixed-configuration switches from Juniper Networks® offer a high-performance standalone solution for access-layer deployments in branch and remote offices as well as campus networks.

Featuring complete Layer 2 and Layer 3 switching capabilities, the EX3200 satisfies the wiring closet connectivity requirements of today's high-performance businesses. Four platform configurations are available offering 24 and 48 10/100/1000BASE-T ports with either full or partial Power over Ethernet (PoE). The base 24- and 48-port EX3200 switches deliver up to 18.6 watts of Class 3 PoE on the first eight ports for supporting networked devices such as telephones, video cameras and wireless LAN (WLAN) access points in converged networks. The EX3200 switches with full PoE deliver up to 18.6 watts on all 24 or 48 ports to support high-density IP telephony and other converged network environments.

The EX3200 also supports optional four-port Gigabit Ethernet (GbE) and two-port 10 GbE uplink modules with pluggable optics to provide high-speed connectivity to aggregation-layer switches or other upstream devices. A field-replaceable power supply and fan tray minimize mean time to repair (MTTR) for the EX3200, ensuring maximum availability.

Standalone Solution Offering Configuration Flexibility and Field Serviceability

· Optional GbE and 10 GbE uplinks reduce capital costs for remote office deployments
· Field-replaceable power supply and fan tray lower MTTR and increase serviceability
· Single release train for Juniper Networks Junos® operating system ensures consistent control plane feature implementation
· Modular Junos OS prevents a switch reboot if a single protocol feature fails
· LCD panel provides a simplified interface for device bring-up, recovery and health checking without requiring a console
· Single management interface
· Limited lifetime switch hardware warranty

The EX3200 offers an integrated Routing Engine (RE) that runs the same modular Juniper Networks Junos OS as Juniper's router products to ensure the consistent implementation and operation of each control plane feature across an entire Juniper Networks infrastructure.

Each EX3200 switch includes an integrated application-specific integrated circuit (ASIC)-based Packet Forwarding Engine, the EX-PFE, to consistently deliver wire-rate forwarding even with all control-plane features enabled. Based on existing field-proven Juniper Networks technology, the EX-PFE and RE bring the same level of carrier-class performance and reliability to the EX3200 line of Ethernet switches that Juniper Networks routers bring to the world's largest service provider networks.

Architecture and Key Components

The EX3200 occupies a single rack unit and deliver a compact solution for crowded wiring closets and access locations where space and power are at a premium.

Each EX3200 switch supports optional front-panel uplink modules offering either four GbE ports or two 10 GbE ports with pluggable optics for high-speed backbone or link-aggregation connections between wiring closets and upstream aggregation switches. Uplink modules can be installed without powering down the switch, enabling users to add high-speed connectivity at any time or to migrate from GbE to 10 GbE uplinks, delivering the ultimate in flexible, high-performance interconnectivity.

The EX3200 also features a front-panel LCD that offers a flexible interface for performing device bring-up and configuration rollbacks, for reporting switch alarm and LED status, or for restoring the switch to its default settings.

A dedicated rear-panel RJ-45 Ethernet port is available for out-of-band management, while a rear-panel USB port can be used to easily upload Junos OS and configuration files.

Features and Benefits

High Availability Features

- Field-replaceable power supplies: The EX3200 supports field-replaceable AC and DC power supplies, reducing MTTR.
- Hot-swappable fan tray: The EX3200 includes a hot-swappable, field-replaceable fan tray, reducing MTTR.
- Carrier-class hardware: The EX3200 leverages a purpose-built packet forwarding engine ASIC—the EX-PFE—which integrates much of the same intellectual property used in Juniper Networks carrier routers. As a result, the EX3200 delivers the same predictable, scalable functionality found in the world's largest networks.
- Redundant Trunk Group (RTG): To avoid the complexities of the Spanning Tree Protocol (STP) without sacrificing network resiliency, the EX3200 employs a redundant trunk group to provide the necessary port redundancy and simplify switch configuration.
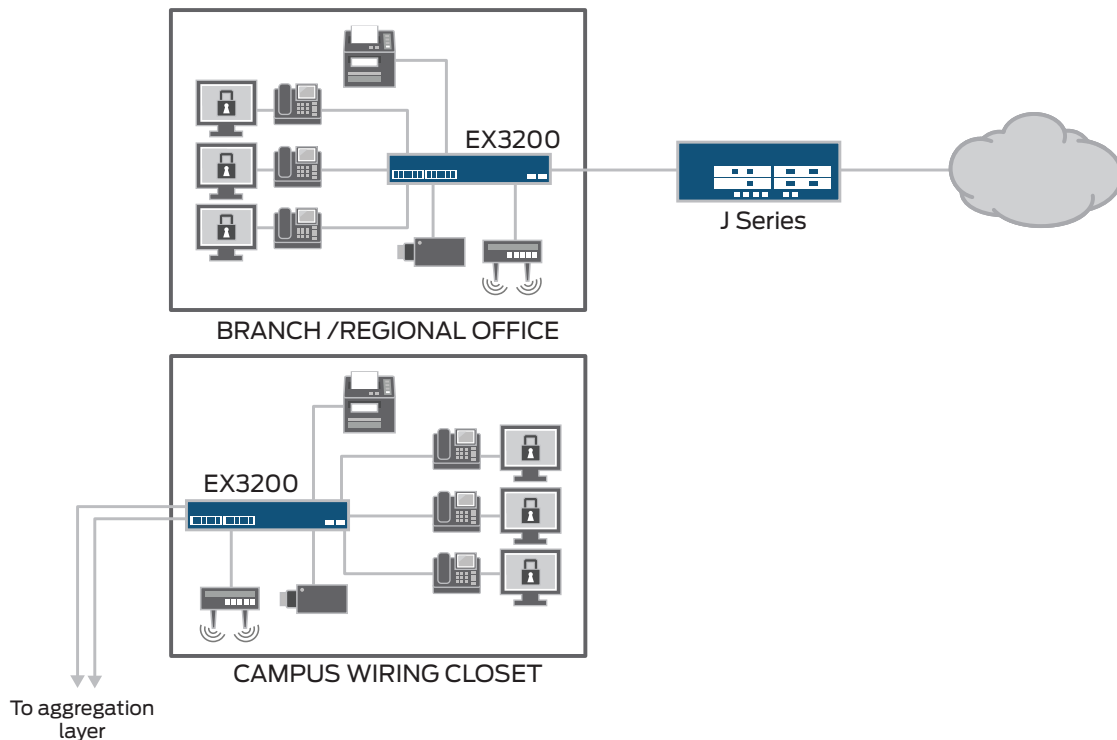

Figure 1: The EX3200 line of Ethernet switches provide a high-performance solution for converged networks in branch offices as well as campus wiring closets.

Carrier-Class Operating System

The EX3200 runs the same Junos OS used by Juniper Networks routers to power the world's largest and most complex networks.

By utilizing a common operating system, Juniper delivers a consistent implementation and operation of control-plane features across all products—functions ranging from chassis management to spanning tree to OSPF. To maintain that consistency, Junos OS adheres to a highly disciplined development process that utilizes a single source code, follows a single quarterly release train, and employs a highly available modular architecture that prevents isolated failures from bringing an entire system down.

These attributes are fundamental to the core value of the software, enabling all products powered by the Junos OS—routers and switches—to be updated simultaneously with the same software release. All features, new and old, are fully regression-tested, making each new release a true superset of the previous version. Customers can deploy a new Junos OS release with complete confidence that all existing capabilities will operate in the same way and be compatible on all Juniper Networks switches and routers in the network.

Figure 2: Junos OS utilizes a single source code, adheres to a consistent and predictable release train, and employs a single modular architecture.

Converged Environments

The EX3200 provides the highest levels of availability in their class for the most demanding converged data, voice and video environments, delivering a reliable platform for unifying enterprise communications.

By providing a full 15.4 watts of Class 3 PoE to power voice over IP (VoIP) telephones, closed-circuit security cameras, wireless access points and other IP-enabled devices, the EX3200 delivers a future-proofed solution for converging disparate networks onto a single IP infrastructure. The base system, which offers eight PoE ports, lowers the cost and complexity of designing the access layer by supporting a small number of WLAN access points or IP phones rather than requiring the purchase of PoE on all 24 or 48 ports. Furthermore, any PoE port can provide up to 18.6 watts to power wireless access points and other PoE powered devices requiring more than Class 3, 15.4 watts of PoE.

To ease deployment, the EX3200 supports the industry-standard Link Layer Discovery Protocol (LLDP) and LLDP-Media Endpoint Discovery (LLDP-MED) protocol, enabling the switches to automatically discover Ethernet-enabled devices, determine their power requirements, and assign virtual LAN (VLAN) membership.

In addition, the EX3200 supports rich quality of service (QoS) functionality for prioritizing data, voice and video traffic. The switches support eight class-of-service (CoS) queues on every port, enabling them to maintain multi-level, end-to-end traffic prioritizations. The EX3200 also supports a wide range of policy options, including strict priority, low-latency, weighted random early drop (WRED) and shaped deficit weighted round-robin (SDWRR) queuing.

Security

The EX3200 fully integrates with the Juniper Networks Unified Access Control (UAC), which consolidates all aspects of a user's identity, device and location. This enables administrators to enforce access control and security down to the individual port or user levels.

Working as an enforcement point within UAC, the EX3200 provides both standards-based 802.1X port-level access control for multiple devices per port, as well as Layer 2-4 policy enforcement based on user identity, location and/or device. A user's identity, device type, machine posture check and location can be used to determine whether access should be granted and for how long. If access is granted, the switch assigns the user's device to a specific VLAN based on authorization policy. The switch can also apply security and/or QoS policies, or it can mirror user traffic to a central location for logging, monitoring or threat detection by intrusion prevention systems.

The EX3200 also provides a full complement of integrated port security and threat detection features, including DHCP (Dynamic Host Configuration Protocol) snooping, DAI (Dynamic ARP Inspection) and MAC limiting to defend against internal and external spoofing, man-in-the-middle and denial-of-service (DoS) attacks.

Simplified Management and Operations

The EX3200 includes port profiles that allow network administrators to automatically configure ports with security, QoS and other parameters based on the type of device connected to the port. Six preconfigured profiles are available, including default, desktop, desktop plus IP phone, WLAN access point, routed uplink and Layer 2 uplink. Users can select from the existing profiles or create their own and apply them through the command line interface (CLI), J-Web interface or management system.

Four system management options are available for the EX3200 line of Ethernet switches. The standard Junos OS CLI management interface offers the same granular capabilities and scripting parameters found in any router powered by Junos OS. The EX3200 also includes the integrated J-Web management tool, an embedded Web-based device manager that allows users to configure, monitor, troubleshoot and perform system maintenance on individual switches via a browser-based graphical interface.
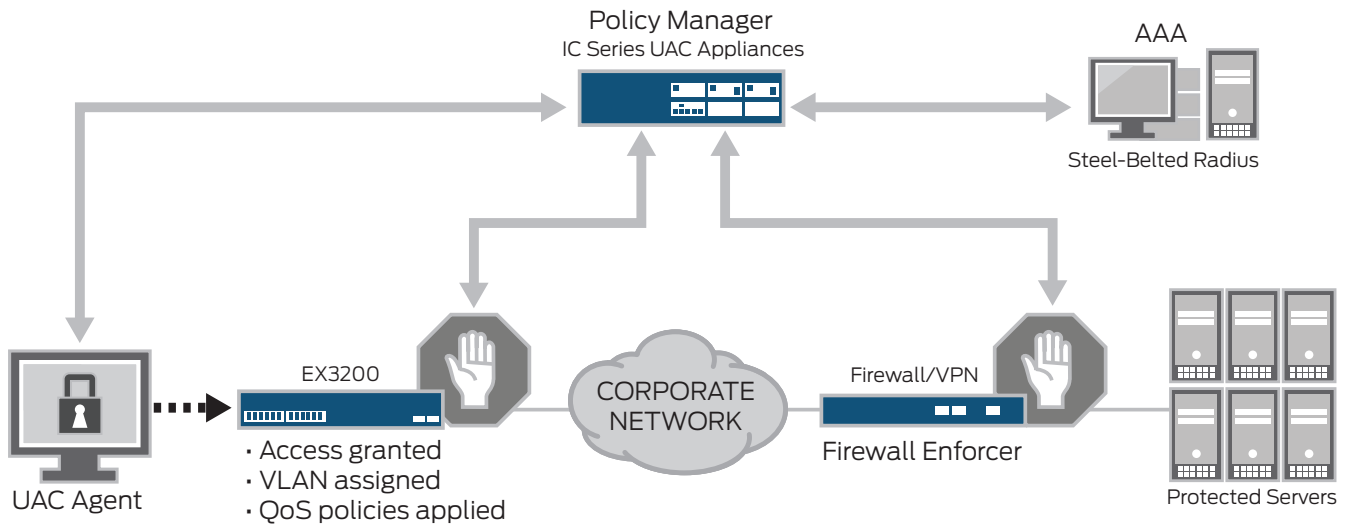
Figure 3: The EX3200 works with Juniper Networks UAC to enforce access control down to the individual port level.

When managing a group of EX3200 line of Ethernet switches, the Juniper Networks Network and Security Manager (NSM) provides system-level management across all Juniper switches in the network from a single console.

Finally, the EX3200 configuration, fault, and performance data can be exported to leading third-party management systems such as HP OpenView, IBM Tivoli and Computer Associates Unicenter software, to provide a complete, consolidated view of network operations.

Product Options

Six EX3200 models are available (see Table 1 below).

Limited Lifetime Warranty

The EX3200 includes a limited lifetime hardware warranty that provides return-to-factory switch replacement for as long as the original purchaser owns the product. The warranty includes lifetime software updates, advanced shipping of spares within one business day, and 24x7 JTAC support for 90 days after the purchase date. Power supplies and fan trays are covered for a period of five years. For complete details please visit **www.juniper. net/support/warranty/**.

Table 1: EX3200 Line of Ethernet Switches

Model	Access Port Configuration	PoE Ports*	Height	POE Budget	Power Supply Rating
EX3200-24T**	24-port 10/100/1000BASE-T	8	1RU	130 W	320 W AC
EX3200-24P	24-port 10/100/1000BASE-T	24	1RU	410 W	600 W AC
EX3200-48T**	48-port 10/100/1000BASE-T	8	1RU	130 W	320 W AC
EX3200-48P	48-port 10/100/1000BASE-T	48	1RU	740 W	930 W AC
EX3200-24T-DC**	24-port 10/100/1000BASE-T	0	1RU	N/A	190 W DC
EX3200-48T-DC**	48-port 10/100/1000BASE-T	0	1RU	N/A	190 W DC

* All PoE ports 802.3af-compliant @ 15.4 W
** NEBS certified

EX3200-24T

EX3200-24P

EX3200-48T

EX3200-48P

EX3200 Specifications

Physical Specifications

- Uplink module options:
  - 4-port GbE module with pluggable SFP optics
  - 2-port 10 GbE module with pluggable XFP optics
  - Dual-mode 2-port 10 GbE SFP+ / 4-port GbE SFP module with pluggable SFP+/SFP optics

Power Options

- AC power supplies: Autosensing 100-120 V / 200-240 V; AC 320 W, 600 W and 930 W
- DC power supply: 190 W DC, input voltage range 36 V - 72 V, dual input feed
- Field replaceable

Dimensions (W x H x D)

- 17.41 x 1.72 x 16.43 in (44.21 x 4.32 x 41.73 cm)
  - [1] Desktop installation width noted above, rack-mount width is 17.5 in (44.5 cm)
  - [2] Height: 1 RU
  - [3] Depth with 320 W AC PSU and 190 W DC PSU noted above, 18.8 in (47.8 cm) with 600/930 W AC PSU

System Weight

- EX3200-24T with 320 W AC PSU: 14.9 lb (6.8 kg)
- EX3200-24P with 600 W AC PSU: 15.7 lb (7.1 kg)
- EX3200-48T with 320 W AC PSU: 15.7 lb (7.1 kg)
- EX3200-48P with 930 W AC PSU: 16.8 lb (7.6 kg)
- EX3200-24T-DC with 190 W DC PSU: 14.9 lb (6.8 kg)
- EX3200-48T-DC with 190 W DC PSU: 15.7 lb (7.1 kg)

Environmental Ranges

- Operating temperature: 32° to 113° F (0° to 45° C)
- Storage temperature: -40° to 158° F (-40° to 70° C)
- Operating altitude: up to 10,000 ft (3,048 m)
- Non-operating altitude: up to 16,000 ft (4,877 m)
- Relative humidity operating: 10% to 85% (non-condensing)
- Relative humidity non-operating: 0% to 95% (non-condensing)

Cooling

- Field-replaceable fan tray
- Airflow: 23.5 cfm

Hardware Specifications

- Switching Engine Model: Store and forward
- DRAM – 512 MB
- Flash – 1 GB
- CPU – 600 MHz PowerPC CPU
- GbE port density per system
  - 24P/24T: 24 (24 host ports or 20 host ports + four-port GbE uplink module)
  - 48P/48T: 48 (48 host ports or 44 host ports + four-port GbE uplink module)
- 10 GbE port density per system (all models): 2 (XFP or SFP+ uplink module)

Optics

- 100 Mbps optic/connector type: LC SFP fiber supporting 100BASE-FX SFP (multimode), LX (single-mode) and BX (single-strand)
- 10/100/1000BASE-T connector type: RJ-45
- GbE SFP optic/connector type: RJ-45 or LC SFP fiber supporting 1000BASE-T SFP, SX (multimode), LX (single-mode) or LH/ZX (single-mode)
- 10 GbE XFP optic/connector type: 10GE XFP LC connector, SR (multimode), LR (single-mode), ER (single-mode) or ZR (single-mode)
- 10 GbE SFP+ optic/connector type: 10GE SFP+ LC connector, SR (multimode), USR (multimode), LR (single-mode), ER (single-mode), LRM (multimode) and DAC (direct-attach copper)

Physical Layer

- Physical port redundancy: Redundant trunk group (RTG)
- Time Domain Reflectometry (TDR) for detecting cable breaks and shorts
- Auto MDI/MDIX support
- Port speed downshift/setting max advertised speed on 10/100/1000BASE-T ports

Packet Switching Capacities (Maximum with 64 Byte Packets)

- 24P/24T: 88 Gbps
- 48P/48T: 136 Gbps

Layer 2/Layer 3 Throughput (Mpps) (Maximum with 64 Byte Packets)

- 24P/24T: 65 Mpps (wire speed)
- 48P/48T: 101 Mpps (wire speed)

EX3200 Specifications (continued)

Layer 2 Switching

- Max MAC addresses per system: 32,000
- Jumbo frames: 9216 Bytes
- Number of VLANs: 4,096
- VST instances: 253
- Port-based VLAN
- MAC-based VLAN
- GVRP
- Voice VLAN
- Compatible with PVST+
- RVI (Routed VLAN Interface)
- IEEE 802.1AB: Link Layer Discovery Protocol (LLDP)
- LLDP-MED with VoIP integration
- IEEE 802.1D: Spanning Tree Protocol
- IEEE 802.1p: CoS prioritization
- IEEE 802.1Q: VLAN tagging
- IEEE 802.1s: Multiple instances of Spanning Tree Protocol (MSTP)
- Number of MST instances supported: 64
- Number of VSTP instances supported: 253
- IEEE 802.1w: Rapid reconfiguration of Spanning Tree Protocol
- IEEE 802.1X: Port Access Control
- IEEE 802.1ak: Multiple Registration Protocol
- IEEE 802.3: 10BASE-T
- IEEE 802.3u 100BASE-T
- IEEE 802.3ab: 1000BASE-T
- IEEE 802.3z: 1000BASE-X
- IEEE 802.3ae: 10 Gigabit Ethernet
- IEEE 802.3af: Power Over Ethernet
- IEEE 802.3x: Pause Frames/Flow Control
- IEEE 802.3ad: Link Aggregation Control Protocol
- IEEE 802.3ah: Ethernet in the First Mile
- ITU-T Y.1731

Layer 3 Features: IPv4

- Max number of ARP entries: 16,000
- Max number of IPv4 unicast routes in hardware: 16,000
- Max number of IPv4 multicast routes in hardware: 8,000
- Routing protocols: RIPv1/v2, OSPF, BGP, IS-IS
- Static routing
- Routing policy
- Bidirectional Forwarding Detection
- Layer 3 redundancy: VRRP

Layer 3 Features: IPv6

- Max number of Neighbor Discovery (ND) entries: 16,000 (shared with IPv4)
- Max number of IPv6 unicast routes in hardware: 4,000
- Max number of IPv6 multicast routes in hardware: 2,000
- Routing protocols: RIPng, OSPFv3
- Static routing

MPLS

- Circuit Cross Connect (CCC)

Supported RFCs

- RFC 768 UDP
- RFC 783 TFTP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 Telnet client and server
- RFC 894 IP over Ethernet
- RFC 903 RARP
- RFC 906 TFTP Bootstrap
- RFC 951, 1542 BootP
- RFC 1027 Proxy ARP
- RFC 1058 RIP v1
- RFC 1112 IGMP v1
- RFC 1122 Host Requirements
- RFC 1195 Use of OSI IS-IS for Routing in TCP/IP and Dual Environments (TCP/IP transport only)
- RFC 1256 IPv4 ICMP Router Discovery (IRDP)
- RFC 1492 TACACS+
- RFC 1519 CIDR
- RFC 1587 OSPF NSSA Option
- RFC 1591 DNS
- RFC 1745 BGP4/IDRP for IP-OSPF Interaction
- RFC 1771 Border Gateway Protocol 4
- RFC 1812 Requirements for IP Version 4 Routers
- RFC 1965 Autonomous System Confederations for BGP
- RFC 1981 Path MTU Discovery for IPv6
- RFC 1997 BGP Communities Attribute
- RFC 2030 SNTP, Simple Network Time Protocol
- RFC 2068 HTTP server
- RFC 2080 RIPng for IPv6
- RFC 2131 BOOTP/DHCP relay agent and DHCP server
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2154 OSPF w/Digital Signatures (Password, MD-5)
- RFC 2236 IGMP v2
- RFC 2267 Network Ingress Filtering
- RFC 2283 Multiprotocol Extensions for BGP-4
- RFC 2328 OSPF v2 (Edge-mode)
- RFC 2338 VRRP
- RFC 2362 PIM-SM (Edge-mode)
- RFC 2370 OSPF Opaque LSA Option
- RFC 2385 TCP MD5 Authentication for BGPv4
- RFC 2439 BGP Route Flap Damping
- RFC 2453 RIP v2
- RFC 2460 Internet Protocol, Version 6 (IPv6) Specification
- RFC 2461 Neighbor Discovery for IP Version 6 (IPv6)
- RFC 2462 IPv6 Stateless Address Autoconfiguration
- RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification

EX3200 Specifications (continued)

Supported RFCs (continued)

- RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2475 DiffServ Core and Edge Router Functions
- RFC 2526 Reserved IPv6 Subnet Anycast Addresses
- RFC 2545 Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)
- RFC 2740 OSPF for IPv6
- RFC 2796 BGP Route Reflection (supersedes RFC 1966)
- RFC 2796 Route Reflection
- RFC 2918 Route Refresh Capability for BGP-4
- RFC 2925 MIB for Remote Ping, Trace
- RFC 3176 sFlow
- RFC 3376 IGMP v3
- RFC 3392 Capabilities Advertisement with BGP-4
- RFC 3484 Default Address Selection for Internet Protocol Version 6 (IPv6)
- RFC 3513 Internet Protocol Version 6 (IPv6) Addressing Architecture
- RFC 3569 draft-ietf-ssm-arch-06.txt PIM-SSM PIM Source Specific Multicast
- RFC 3579 RADIUS EAP support for 802.1x
- RFC 3623 OSPF Graceful Restart
- RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4360 BGP Extended Communities Attribute
- RFC 4443 ICMPv6 for the IPv6 Specification
- RFC 4486 Subcodes for BGP Cease Notification message
- RFC 4861 Neighbor Discovery for IPv6
- RFC 4862 IPv6 Stateless Address Autoconfiguration
- RFC 4915 MT-OSPF
- RFC 5176 Dynamic Authorization Extensions to RADIUS
- Draft-ietf-bfd-base-05.txt Bidirectional Forwarding Detection
- Draft-ietf-idr-restart-10.txt Graceful Restart Mechanism for BGP
- Draft-ietf-isis-restart-02 Restart Signaling for IS-IS
- Draft-ietf-isis-wg-multi-topology-11 Multi Topology (MT) Routing in IS-IS
- Internet draft-ietf-isis-ipv6-06.txt, Routing IPv6 with IS-IS
- LLDP Media Endpoint Discovery (LLDP-MED), ANSI/TIA-1057, draft 08
- PIM-DM Draft IETF PIM Dense Mode draft-ietf-idmr-pimdm-05.txt, draft-ietf-pim-dm-new-v2-04.txt

Security

- MAC limiting
- Allowed MAC addresses – configurable per port
- Dynamic ARP inspection (DAI)
- IP source guard
- Local proxy ARP
- Static ARP support
- DHCP snooping
- Captive Portal
- Persistent MAC address configurations

Access Control Lists (ACLs) (Junos OS firewall filters)

- Port-based ACL (PACL) – Ingress and Egress
- VLAN-based ACL (VACL) – Ingress and Egress
- Router-based ACL (RACL) – Ingress and Egress
- ACL entries (ACE) in hardware per system: 7,000
- ACL counter for denied packets
- ACL counter for permitted packets
- Ability to add/remove/change ACL entries in middle of list
- (ACL editing)
- Layer 2 – L4 ACL
- 802.1X port-based
- 802.1X multiple supplicants
- 802.1X with VLAN assignment
- 802.1X with authentication bypass access (based on host MAC address)
- 802.1X with VoIP VLAN support
- 802.1X dynamic ACL based on RADIUS attributes
- 802.1X Supported EAP types: MD5, TLS, TTLS, PEAP
- TNC certified
- MAC Authentication (RADIUS)
- Control Plane DoS protection

High Availability

- Field-replaceable power supply
- Field-replaceable fan
- Graceful protocol restart—OSPF, BGP
- Online insertion and removal (OIR) uplink module

EX3200 Specifications (continued)

Link Aggregation

- 802.3ad (LACP) support:
  - Number of LAGs supported: 32
  - Max number of ports per LAG: 8
- LAG load-sharing algorithm – Bridged or Routed (Unicast or Multicast) Traffic:
  - IP: S/D IP
  - TCP/UDP: S/D IP, S/D Port
  - Non-IP: S/D MAC
- Tagged ports support in LAG

Quality of Service (QoS)

- Layer 2 QoS
- Layer 3 QoS
- Ingress policing: 1 rate 2 color
- Hardware queues per port: 8
- Scheduling methods (egress): Strict priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR)
- 802.1p, DSCP /IP Precedence trust and marking
- L2-L4 Classification criteria: Interface, MAC address, Ethertype, 802.1p, VLAN, IP address, DSCP/IP Precedence, TCP/UDP port numbers, etc.
- Congestion avoidance capabilities: Tail Drop

Multicast

- IGMP: v1, v2, v3
- IGMP snooping
- PIM-SM, PIM-SSM, PIM-DM

Services and Manageability

- Junos OS CLI
- Web interface
- Out-of-band management: Serial; 10/100/1000BASE-T Ethernet
- ASCII configuration
- Rescue configuration
- Configuration rollback
- Image rollback
- LCD management
- Element management tools: Network and Security
- Manager (NSM)
- Proactive services support via Advanced Insight Solutions (AIS)
- SNMP: v1, v2c, v3
- RMON (RFC 2819) Groups 1, 2, 3, 9
- NTP
- DHCP server
- DHCP client and DHCP proxy
- DHCP relay and helper
- RADIUS
- TACACS+
- SSHv2
- Secure copy
- HTTP/HTTPs
- DNS resolver
- Syslog logging
- Temperature sensor
- Config-backup via FTP / secure copy

Supported MIBs*

- RFC 1155 SMI
- RFC 1157 SNMPv1
- RFC 1212, RFC 1213, RFC 1215 MIB-II, Ethernet-Like MIB & TRAPs
- RFC 1493 Bridge MIB
- RFC 1643 Ethernet MIB
- RFC 1657 BGP-4 MIB
- RFC 1724 RIPv2 MIB
- RFC 1850 OSPFv2 MIB
- RFC 1905 RFC 1907 SNMP v2c, SMIv2 and Revised MIB-II
- RFC 2011 SNMPv2 for internet protocol using SMIv2
- RFC 2012 SNMPv2 for transmission control protocol using SMIv2
- RFC 2013 SNMPv2 for user datagram protocol suing SMIv2
- RFC 2096 IPv4 Forwarding Table MIB
- RFC 2287 System Application Packages MIB
- RFC 2570 – 2575 SNMPv3, user based security, encryption and authentication
- RFC 2576 Coexistence between SNMP Version 1, Version 2 and Version
- RFC 2578 SNMP Structure of Management Information MIB
- RFC 2579 SNMP Textual Conventions for SMIv2
- RFC 2665 Ethernet-like interface MIB
- RFC 2787 VRRP MIB
- RFC 2819 RMON MIB
- RFC 2863 Interface Group MIB
- RFC 2863 Interface MIB
- RFC 2922 LLDP MIB
- RFC 2925 Ping/Traceroute MIB
- RFC 2932 IPv4 Multicast MIB
- RFC 3413 SNMP Application MIB
- RFC 3414 User-based Security model for SNMPv3
- RFC 3415 View-based Access Control Model for SNMP
- RFC 3621 PoE-MIB (PoE switches only)
- RFC 4188 STP & Extensions MIB
- RFC 4363 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering and VLAN extensions
- Draft – blumenthal – aes – usm - 08
- Draft – reeder - snmpv3 – usm - 3desede -00
- Draft-ietf-bfd-mib-02.txt
- Draft-ietf-idmr-igmp-mib-13
- Draft-ietf-idmr-pim-mib-09
- Draft-ietf-idr-bgp4-mibv2-02.txt – Enhanced BGP-4 MIB
- Draft-ietf-isis-wg-mib-07

Troubleshooting

- Debugging: CLI via console, Telnet or SSH
- Diagnostics: Show and debug cmd, statistics
- Traffic mirroring (port)
- Traffic mirroring (VLAN)
- ACL-based mirroring
- Mirroring destination ports per system: 1
- LAG port monitoring
- Multiple destination ports monitored to 1 mirror (N:1)
- Max number of mirroring sessions: 1
- Mirroring to remote destination (over L2): 1 destination VLAN
- IP tools: Extended ping & trace
- Juniper Networks commit and rollback

*Unless explicitly specified for any particular MIB table or variables, Junos OS does not support SNMP set operations.

EX3200 Specifications (continued)

Warranty
- Limited lifetime switch hardware warranty

Safety and Compliance

Safety Certifications
- UL-UL60950-1(First Edition)
- C-UL to CAN/CSA 22.2 No.60950-1(First Edition)
- TUV/GS to EN 60950-1, Amendment A1-A4, A11
- CB-IEC60950-1, all country deviations

Electromagnetic Compatibility Certifications
- FCC 47CFR Part 15 Class A
- EN 55022 Class A
- ICES-003 Class A
- VCCI Class A
- AS/NZS CISPR 22 Class A
- CISPR 22 Class A
- EN 55024
- EN 300386
- CE

NEBS
- GR-63-Core: NEBS, Physical Protection
- GR-1089-Core: EMC and Electrical Safety for Network Telecommunications Equipment
- All models except EX3200-24P and EX3200-48P

Environmental
- Reduction of Hazardous Substances (ROHS) 5

Telco
- CLEI code

Joint Interoperability Test Command (JITC)
- Department of Defense (DoD) Unified Capabilities (UC) Approved Products List (APL)

Common Criteria
- CC-EAL3

Metro Ethernet Forum
- MEF 9

Telecom Quality Management
- TL9000

Trusted Network Connect
- TNC IF-PEP

FIPS
- FIPS 140-2 Level 1

Noise Specifications

Noise measurements based on operational tests taken from bystander position (front) and performed at 23º C in compliance with ISO 7779.

Model	Power Supply Rating	Acoustic Noise in dBA
EX3200-24T	320 W AC	53.2
EX3200-24P	600 W AC	55.6
EX3200-48T	320 W AC	53.4
EX3200-48P	930 W AC	55.0
EX3200-24T-DC	190 W DC	47.8
EX3200-48T-DC	190 W DC	47.0

Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit **www.juniper.net/us/en/ products-services**.

Ordering Information

Model Number	Description
Switches[1]	
EX3200-24T	24-port 10/100/1000BASE-T (8 PoE ports) + 320 W AC PSU
EX3200-24P	24-port 10/100/1000BASE-T (24 PoE ports) + 600 W AC PSU
EX3200-48T	48-port 10/100/1000BASE-T (8 PoE ports) + 320 W AC PSU
EX3200-48P	48-port 10/100/1000BASE-T (48 PoE ports) + 930 W AC PSU
EX3200-24T-DC	24-port 10/100/1000BASE-T + 190 W DC PSU
EX3200-48T-DC	48-port 10/100/1000BASE-T + 190 W DC PSU
EX3200-24T-TAA	Trade Agreement Act-compliant 24-port 10/100/1000BASE-T (8 PoE ports) + 320 W AC PSU
EX3200-24P-TAA	Trade Agreement Act-compliant 24-port 10/100/1000BASE-T (24 PoE ports) + 600 W AC PSU
EX3200-48T-TAA	Trade Agreement Act-compliant 48-port 10/100/1000BASE-T (8 PoE ports) + 320 W AC PSU
EX3200-48P-TAA	Trade Agreement Act-compliant 48-port 10/100/1000BASE-T (48 PoE ports) + 930 W AC PSU
Mounting Options	
EX-4PST-RMK	Adjustable 4-post rack mount kit for EX4200 and EX3200
EX-WMK	EX4200 and EX3200 wall mount kit
Advanced Feature Licenses[2]	
EX-24-AFL	Advanced Feature License for EX3200-24T, EX3200-24T-DC and EX3200-24P switches
EX-48-AFL	Advanced Feature License for EX3200-48T, EX3200-48T-DC and EX3200-48P switches
Uplink Modules	
EX-UM-2XFP	2-port 10GbE XFP Uplink Module
EX-UM-4SFP	4-port GbE SFP Uplink Module
EX-UM-2X4SFP	2-port 10G SFP+ / 4-port 1G SFP Uplink Module
Power Supplies	
EX-PWR-320-AC	320 W AC Power Supply Unit (PSU)
EX-PWR-600-AC	600 W AC Power Supply Unit (PSU)
EX-PWR-930-AC	930 W AC Power Supply Unit (PSU)
EX-PWR-190-DC	190 W DC Power Supply Unit (PSU)
Pluggable Optics	
EX-SFP-1FE-FX	SFP 100BASE-FX; LC connector; 1310nm; 2km reach on multimode fiber
EX-SFP-1FE-LX	SFP 100BASE-LX; LC connector; 1310nm; 10km reach on single-mode fiber
EX-SFP-1FE-LX40K	SFP 100BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber
EX-SFP-1FE-LH	SFP 100BASE-LX; LC connector; 1310nm; 80km reach on single-mode fiber

Model Number	Description
Pluggable Optics (continued)	
EX-SFP-FE20KT13R15	SFP 100BASE-BX; LC connector; TX 1310nm/RX 1550nm; 20km reach on single-strand, single-mode fiber
EX-SFP-FE20KT15R13	SFP 100BASE-BX; LC connector; TX 1550nm/RX 1310nm; 20km reach on single-strand, single-mode fiber
EX-SFP-1GE-T	SFP 10/100/1000BASE-T copper; RJ-45 connector; 100m reach on UTP
EX-SFP-1GE-SX	SFP 1000BASE-SX; LC connector; 850nm; 550m reach on multimode fiber
EX-SFP-1GE-LX	SFP 1000BASE-LX; LC connector; 1310nm; 10km reach on single-mode fiber
EX-SFP-GE10KT13R14	SFP 1000BASE-BX; Tx 1310nm/Rx 1490nm for 10km transmission on single-strand, single-mode fiber
EX-SFP-GE10KT13R15	SFP 1000BASE-BX; Tx 1310nm/Rx 1550nm for 10km transmission on single-strand, single-mode fiber
EX-SFP-GE10KT14R13	SFP 1000BASE-BX; Tx 1490nm/Rx 1310nm for 10km transmission on single-strand, single-mode fiber
EX-SFP-GE10KT15R13	SFP 1000BASE-BX; Tx 1550nm/Rx 1310nm for 10km transmission on single-strand, single-mode fiber
EX-SFP-1GE-LX40K	SFP 1000BASE-LX; LC connector; 1310nm; 40km reach on single-mode fiber
EX-SFP-GE40KT13R15	SFP 1000BASE-BX; Tx 1310nm/Rx 1550nm for 40km transmission on single-strand, single-mode fiber
EX-SFP-GE40KT15R13	SFP 1000BASE-BX; Tx 1550nm/Rx 1310nm for 40km transmission on single-strand, single-mode fiber
EX-SFP-1GE-LH	SFP 1000BASE-LH; LC connector; 1550nm; 70km reach on single-mode fiber
EX-XFP-10GE-SR	XFP 10GBASE-SR; LC connector; 850nm; 300m reach on 50 microns multimode fiber; 33m on 62.5 microns multimode fiber
EX-XFP-10GE-LR	XFP 10GBASE-LR; LC connector; 1310nm; 10km reach on single-mode fiber
EX-XFP-10GE-ER	XFP 10GBASE-ER; LC connector; 1550nm; 40km reach on single-mode fiber
EX-XFP-10GE-ZR	XFP 10GBASE-ZR; LC connector; 1550nm; 80km reach on single-mode fiber
EX-SFP-10GE-SR	SFP+ 10GBASE-SR; LC connector; 850nm; 300m reach on 50 microns multimode fiber; 33m on 62.5 microns multimode fiber
EX-SFP-10GE-LRM	SFP+ 10GBASE-LRM; LC connector; 1310nm; 220m reach on multimode fiber
EX-SFP-10GE-LR	SFP+ 10GBASE-LR; LC connector; 1310nm; 10km reach on single-mode fiber
EX-SFP-10GE-DAC-1M	SFP+ 10 Gigabit Ethernet Direct Attach Copper (twinax copper cable), 1m
EX-SFP-10GE-DAC-3M	SFP+ 10 Gigabit Ethernet Direct Attach Copper (twinax copper cable), 3m
EX-SFP-10GE-DAC-5M	SFP+ 10 Gigabit Ethernet Direct Attach Copper (twinax copper cable), 5m

Ordering Information

Model Number	Description
Pluggable Optics (continued)	
EX-SFP-10GE-DAC-7M	SFP+ 10 Gigabit Ethernet Direct Attach Copper (twinax copper cable), 7m
EX-SFP-10GE-ER	SFP+ 10GBASE-ER 10 Gigabit Ethernet Optics, 1550nm for 40km transmission on single-mode fiber
EX-SFP-10GE-USR	SFP+ 10 Gigabit Ethernet Ultra Short Reach Optics, 850 nm for 10m on OM1, 20m on OM2, 100m on OM3 multimode fiber

[1] Each switch comes with one power supply, RJ-45 cable, RJ-45-to-DB-9 serial port adapter and 19" rack mount kit. Each system also ships with a power cord for the country to which it is being shipped.

[2] AFL includes licenses for IS-IS, BGP, MPLS and IPv6 routing.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at **www.juniper.net**.

To purchase Juniper Networks solutions, please contact your Juniper Networks representative at 1-866-298-6428 or authorized reseller.

1000216-014-EN   June 2013   Printed on recycled paper