



Juniper Networks J-series Services Routers: J2320, J2350, J4350, and J6350

Product Description

Enterprises are faced with a number of challenges and opportunities by converging voice, video and data to one network. This consolidation of network elements reduces cost by easing deployment of SIP enabled voice over IP (VoIP), real-time high-definition Telepresence and standardizing on a consistent infrastructure network operating system like JUNOS software. These new technologies improve; customer relations, interactions with suppliers, and employee productivity. This mission-critical multi-media network must be always on and always available. To accomplish this, fully integrated stateful security is a key requirement, not merely forwarding packets without regard to the intended application or individual user session. JUNOS software with enhanced services provides the high-performance networking infrastructure that helps enterprises implement key initiatives that:

- Secure critical information and protect the network from vulnerabilities and attacks. Enterprises need to protect confidential information from external and internal attacks as they connect with their customers and suppliers. The inseparable routing and firewall offered by JUNOS software with enhanced services secures every location in the network and allows departmental segmentation out to remote locations of the network. Implementing IPSec VPNs with firewalls at remote sites allows for flexible network connectivity with security for split tunneling configurations.
- Minimize the cost of installing and operating the network. With the modular, protected mode design of JUNOS software and the rigorous JUNOS software development and testing process, there are fewer system process failures.
- Superior configuration management reduces human errors that could lead to network downtime. The single code source of JUNOS software makes the qualification of new releases across the network much simpler.
- Simplify the operation of the branch network. JUNOS software with enhanced services integrates best-in-class routing with best-in-class stateful inspection firewall. In addition, an active-active network topology provides stateful High Availability and systems level resiliency for mission critical networks. The J-series delivers “branch in a box” simplicity. This integrated package is easier to install, configure, and operate compared with discrete devices in the network.

Juniper Networks J-series services routers extend Enterprise applications and deliver reliable connectivity to remote offices with a powerful blend of high-performance network protection and advanced services. J-series services routers leverage the modular JUNOS® software operating system and Juniper's rich product and partner portfolio to consolidate market leading security, application optimization, and voice capabilities onto a single, easy to manage platform. Our innovative security approach inseparably integrates routing and firewalls for exceptional performance. Available options, including integrated Juniper WX application acceleration and integrated voice gateway technology from Avaya, make the J-series the ideal choice for closing the distance between central resources and remote locations.

Key Hardware Features of the J-series Services Routers

Product	Description
J2320	<ul style="list-style-type: none"> Support for T1, E1, Synchronous Serial, ISDN Basic Rate Interface, ADSL2/ADSL2+, G.SHDSL, and Gigabit Ethernet interfaces Support for integrated IP telephony using the Avaya IG550 Integrated Gateway Support for application acceleration using the Juniper WXC Integrated Service 4 fixed Gigabit Ethernet LAN ports, and 3 PIM slots 512 MB DRAM default, expandable to 1 GB DRAM 512 MB compact flash default, upgradeable to 1 GB Hardware encryption acceleration (optional)
J2350	<ul style="list-style-type: none"> Support for T1, E1, Synchronous Serial, ISDN BRI, ADSL/2/2+, G.SHDSL, and Gigabit Ethernet interfaces Support for integrated IP telephony using the Avaya IG550 Integrated Gateway Support for application acceleration using the Juniper WXC Integrated Service Module 4 fixed Gigabit Ethernet LAN ports, and 5 PIM slots 512 MB DRAM default, expandable to 1 GB DRAM 512 MB compact flash default, upgradeable to 1 GB Hardware encryption acceleration (optional) DC version available NEBS-compliant models available
J4350	<ul style="list-style-type: none"> Support for T1, E1, Fast Ethernet, Synchronous Serial, ISDN BRI, ADSL2/ADSL2+, G.SHDSL, DS3, E3, Gigabit Ethernet interfaces Support for integrated IP telephony using the Avaya IG550 Integrated Gateway Support for application acceleration using the Juniper WXC Integrated Service Module 4 fixed Gigabit Ethernet LAN ports, 4 PIM slots, and 2 EPIM/PIM slots DC version available 1 GB or 512 MB DRAM default, expandable to 2 GB DRAM 512 MB compact flash default, upgradeable to 1 GB Hardware encryption acceleration (optional) NEBS-compliant models available
J6350	<ul style="list-style-type: none"> Support for T1, E1, Fast Ethernet, Synchronous Serial, ISDN BRI, ADSL2/ADSL2+, G.SHDSL, DS3, E3, Gigabit Ethernet interfaces Support for integrated IP telephony using the Avaya IG550 Integrated Gateway Support for application acceleration using the Juniper WXC Integrated Service Module 4 fixed Gigabit Ethernet LAN ports, 2 PIM slots, and 4 EPIM/PIM slots DC version available 1 GB DRAM default, expandable to 2 GB DRAM 512 MB compact flash default, upgradeable to 1 GB Hardware encryption acceleration standard NEBS-compliant models available Redundant AC or DC power supplies

Architecture and Key Components of JUNOS Software

What is it? A single-source network OS that integrates routing, switching and security services for high-performance networks

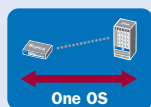
Why does it matter?

Competitors' software hinders network enhancement for new business needs and drives up costs:

- Monolithic software architectures—greater risk of downtime from software instabilities, performance degradation and security attacks with the inter-dependencies of co-mingled processes; requires repetitive tuning and fixes
- Multiple release trains and software versions—needless complexity leads to feature inconsistency, including gaps in backwards compatibility, and the need for frequent fixes and extensive planning and testing for upgrades raises risks of human error

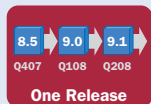
Why is it different?

The Way it is Built



One OS

- Single code source
- Consistent implementation of features



One Release

- Single software release train of feature supersets
- Stable, predictable enhancements



One Architecture

- Modular software with resource separation
- Fast, stable, highly available and secure

Delivers High-Performance Operations



Continuous Systems



Automated Operations



Accelerated Innovations

With the release of 9.1, we have enhanced the JUNOS software with a secure firewall and VPN module that combines the functionality of two boxes into one. This fundamental advancement in the architecture is based on the requirement that forwarding packets at wire-speed, while great in a lab with test equipment, may not be best practice in a real network where security threats can be propagated just as quickly. Simplifying the branch deployment by reducing multiple appliances or boxes performing specialized tasks like; stateful firewalling, security zones and Application Level Gateways, which reduces costs and manageability efforts. Juniper has taken the approach of integrating a flow based stateful firewall into the core of JUNOS software in the J-series Services Routers for the branch to reduce the number of boxes, consolidate configurations onto one device and leverage the key intellectual property of ScreenOS as an integral component of JUNOS software.

Packet-Based Forwarding

A router's main purpose is to connect clients and servers at wire speed with implied trust. This routing is performed on a packet by packet basis without regard to flow or state information. This architectural choice relies on firewalls to inspect traffic on a flow and state basis to determine potential attacks on the network of clients and servers. A router will keep track of TCP traffic session information with a simple hash algorithm to make sure that traffic that takes multiple links arrives at the destination in the correct order. This JUNOS software architecture is based on deployments as the core operating systems on some of the Internet's largest Tier 1 networks' core routers. This architecture has the benefit of massive scaling since it has a fundamentally easier task of forwarding packets *without* regard to keeping track of individual flows or state. Service Providers have a different view of network topology compared to branch enterprises since they have *many links* between routers and locations. By forwarding traffic on a packet by packet basis, *link utilization or link load balancing* through various protocols (OSPF ECMP, OSPF TE, RSVP TE, IS-IS, BGP and MLPP) can be achieved to keep throughput within Service Level Agreement terms. The typical enterprise deployment of Virtual Router Redundancy Protocol (VRRP) runs two routers in an *active-standby* format, and if a link or router should fail, then the backup link or router can be activated. This is a common deployment scenario for enterprise networks.

Session-Based Forwarding: A Key Advancement

A firewall's main purpose is to inspect traffic flows and state to ensure that returning information in the same session is expected and permitted. This architectural choice receives packets from a wide variety of clients and servers and keeps track of *every* session, of *every* application of *every* user. These flows can vary considerably based on the client / server loads as opposed to link load balancing of routers and the overall decentralized or centralized nature of the branch to headquarters/data center topology.

To secure all network connections, Juniper Networks Service Routers with JUNOS software with enhanced services devices use a dynamic packet filtering method known as stateful inspection. Using this method, the J-series Service Routers with JUNOS software with enhanced services collect information on various components in a packet header—source and destination IP addresses, source and destination port numbers, and protocol. The J-series Service Routers then maintains the state of each TCP

session or UDP pseudo-session traversing the firewall, performing TCP reassembly when necessary to ensure proper interpretation of the communication session. When a responding packet arrives, the firewall will compare the information reported in its header with the state of its associated session stored in the inspection table. If they match, the responding packet is allowed to pass the firewall. If the two do not match, the packet is dropped. The Juniper Networks firewall can secure a network by inspecting, and then allowing or denying, all connection attempts that require crossing an interface from and to that network.

By default, the Juniper Networks Services Router with JUNOS software with enhanced services denies all traffic in all directions, and this is in comparison to a router that forwards all traffic with out regard to flow and state. Using centralized, policy-based management, enterprises can create a series of security policies that will control the traffic flow from clients to servers by defining the kinds of traffic permitted to pass from specified sources to specified destinations at scheduled times. At the broadest level, all types of traffic can be allowed from any source in security

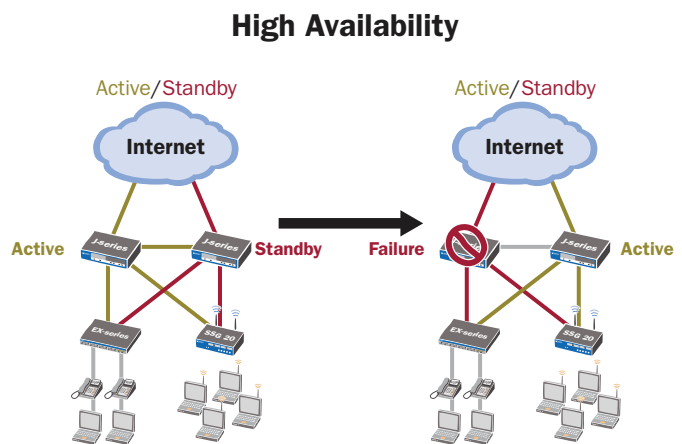


Figure 1: System redundancy in an active-passive configuration maintains all session information on a standby J-series in the event of a box failure. Network capacity is always one half of the maximum.

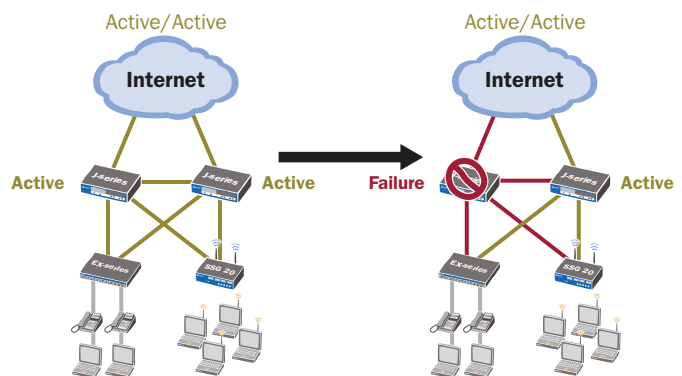


Figure 2: System redundancy in an active-active configuration maintains all session information load balanced across two active J-series. Since Network capacity is load balanced, using all available resources when active-active and half the capacity in the event of a failure.

zones to any destination in all other zones without any scheduling restrictions. At the narrowest level, policies can be created that allow only one kind of traffic between a specified host in one zone and another specified host in another zone during a scheduled period of time.

Stateful inspection is more secure than other firewall or Access Control List router technology such as packet filtering because it opens smaller “holes” through which traffic can pass. For example, instead of permitting any host or program to send any kind of TCP traffic on port 80, a stateful inspection firewall ensures that packets belong to an existing legitimate session. Furthermore, it can authenticate the user when the session is established, determine whether the packets really carry HTTP, and enforce granular constraints at the application layer (e.g., filtering URLs to deny access to black-listed sites).

By combining the JUNOS software Services Redundancy Protocol (JSRP) and firewalling features, a pair of J-series routers can be easily integrated into a High Availability network architecture, with redundant physical connections between the Services Routers and the adjacent networks. With link redundancy, Juniper Networks can address many common causes of system failures, such as a physical port going bad or a cable getting disconnected, to ensure the connection is available, without having to fail over the entire system. This is consistent with a typical *active-standby* nature of routing resiliency protocols.

When J-series routers are configured as an active-active pair using JUNOS software with enhanced services, traffic and configuration will be automatically mirrored to provide active firewall and VPN session maintenance. *The J-series routers can now synchronize both static information, such as the configuration, and dynamic run-time information. As a result, during failover, synchronization of the following information is shared: connection/session state and flow information, IPSec security associations, Network Address Translation (NAT traffic), address book information, configuration changes, and more.* In contrast to the typical router active-standby resiliency protocols, VRRP for instance, in the event of a router failover all dynamic flow and session information is lost and must be reestablished. Some or all applications sessions will have to restart depending on the convergence time of the links or routers. J-series Service Routers with JUNOS software with enhanced services, maintain state, and not only is the session preserved, but security is intact.

Session-Based Forwarding without the Performance Hit

In order to optimize the throughput and latency of the combined router and firewall, JUNOS software with enhanced services implements session-based forwarding, an innovation that combines the session state information of a traditional firewall and the next-hop forwarding of a classic router into a single operation. With JUNOS software, a session that is permitted by the forwarding policy is added to the forwarding table along with a pointer to the

next-hop route. Established sessions have a single table lookup to verify that the session has been permitted and to find the next hop. This efficient algorithm improves throughput and lowers latency for session traffic when compared with a classic router that performs multiple table lookups to verify session information and then to find a next-hop route.

JUNOS software with enhanced services brings high-performance routing together with best-in-class integrated security to branch locations in the distributed enterprise. JUNOS software tightly integrates security services by bringing the power of sessions to deliver a true security device. This inseparable joining of routing and security improves performance and latency compared with classic routers. JUNOS software with enhanced services is available on the Juniper Networks J-series Services Routers.

Figure 3 shows the session-based forwarding algorithm. When a new session is established, the session-based architecture within JUNOS software verifies that the session is allowed by the forwarding policies. If the session is allowed, JUNOS software will look up the next-hop route in the routing table. It inserts the session and the next-hop route into the session and forwarding table and forwards the packet. Subsequent packets for the established session require a single table lookup in the session and forwarding table, and are forwarded to the egress interface.

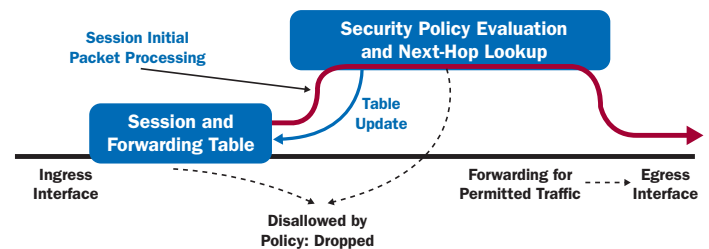


Figure 3: Session-Based Forwarding Algorithm

Important Notes

Juniper realizes that every customer may not be ready to make the change to JUNOS software with enhanced services. We will continue to support packet based JUNOS software according to our standard lifecycle policy and customers with support contracts can implement either version of JUNOS 9.1 software at no additional cost. This, in the simplest terms, turns your router into a router plus a firewall for no additional costs. It is also important to realize that a configuration from packet-based JUNOS software will need additional configuration to enable traffic to flow by implementing the appropriate security zone policies. This additional configuration is easily offset by the peace of mind of securing your traffic from network attack by using a best-in-class firewall, reduction in network elements (firewall), and active-active session synchronization in a pair topology (instead of active-standby).

Network Deployments

The J-series Services Routers are deployed at branch and remote locations in the network to provide all-in-one secure WAN connectivity, IP telephony, and connection to local PCs and servers via integrated Ethernet switching.

Product Options

Juniper Networks J2320, J2350, J4350, and J6350 routers offer a number of options in terms of LAN and WAN ports, hardware encryption acceleration, power supplies, DRAM, compact flash, and feature licenses.

LAN Ports

All J2320, J2350, J4350, and J6350 routers ship with four fixed 10/100/1000 Ethernet ports. You can add more modular LAN interfaces by ordering the appropriate PIMs, Enhanced PIMs (EPIMs), or Universal PIMs (UPIMs). For more information, see the J-series WAN and LAN Modules Ordering Information section on page 12.

WAN Ports

All J2320, J2350, J4350, and J6350 routers ship without fixed WAN ports. The customer can add modular WAN interfaces by ordering the appropriate PIMs. For more information, see the J-series WAN and LAN Modules Ordering Information section on page 12.

Hardware Encryption Acceleration

The J2320, J2350, and J4350 are available with optional hardware encryption acceleration. All J6350 models include hardware encryption acceleration by default. If you purchase a J2320, J2350, or J4350 without hardware encryption, you can add it later by ordering the appropriate encryption card.

Power Supply

All J2350, J4350, and J6350 routers ship with either a DC power supply or an AC power supply and include a region-specific power cord. (The J2320 is available with AC power only.) The J6350 supports a second redundant AC or DC power supply, which can be added by ordering SSG-PS-DC or SSG-PS-AC. The region-specific AC power cable for SSG-PS-AC must be ordered separately.

DRAM

The J2320 and J2350 are upgradeable to a maximum of 1 GB DRAM. The J2320 and J2350 models without hardware encryption acceleration (J2320-JB-SC and J2350-JB-SC) come with 512 MB DRAM. All other models come with 1 GB of DRAM.

All J4350 models are upgradeable to a maximum of 2 GB DRAM. The J4350 model that ships without hardware encryption acceleration (J-4350-JB-SC) ships with 512 MB of DRAM. All other J4350 models ship with 1 GB of DRAM.

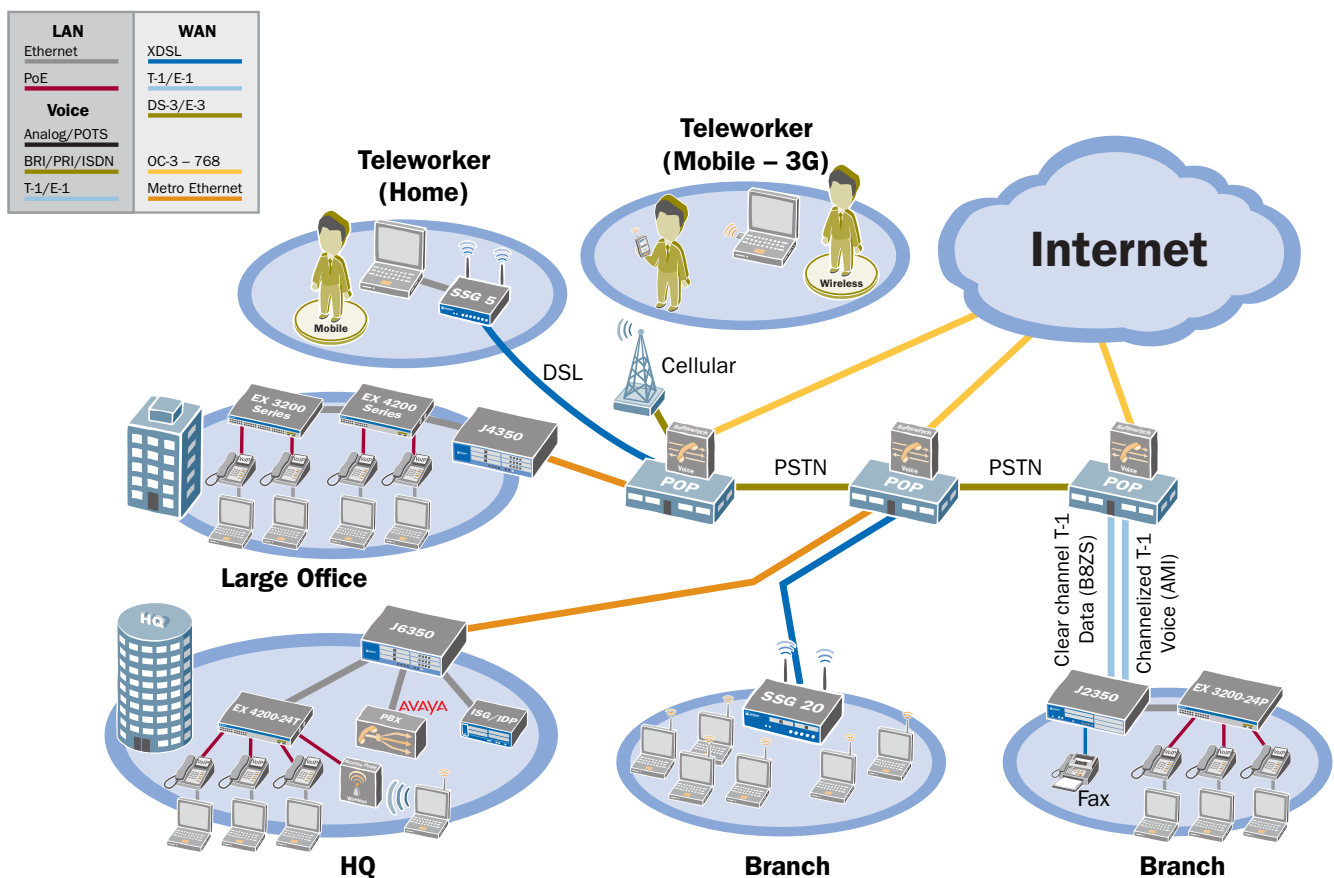


Figure 4: A typical network scenario is depicted for a distributed or branch enterprise. By using IPSec VPNs over the Internet, remote sites, branch offices, small datacenters and the headquarters are all connected as if they were in the same location. A variety of WAN connections are depicted.

All J6350 routers ship with 1 GB of DRAM and are upgradeable to 2 GB of DRAM. Order and install two additional JXX50-MEM-512M-S DIMMs.

Note that when upgrading DRAM, DIMMs should always be installed in pairs; for example, to upgrade to 1 GB DRAM, order two JXX50-MEM-512M-S DIMMs. To upgrade to 2 GB DRAM, order four JXX50-MEM-512M-S DIMMs.

With JUNOS software Release 9.1 and later, all J-series routers (J2320, J2350, J4350, J6350) must run at least 512 MB of DRAM.

Compact Flash

All J2320, J2350, J4350, and J6350 routers ship with 512 MB of primary compact flash. You can replace that with a larger compact flash by ordering one either JX-CF-512M-S (for 512 MB) or JX-CF-1G-S (for 1 GB).

J4350 and J6350 Supported Memory Configurations

Total Memory	DIMM 0	DIMM 1	DIMM 2	DIMM 3
512 MB	512 MB			
512 MB	256 MB	–	256 MB	–
1 GB	256 MB	256 MB	256 MB	256 MB
1 GB	512 MB	–	512 MB	–
2 GB	512 MB	512 MB	512 MB	512 MB

Specifications

Protocols

- IPv4, IPv6, ISO CLNS

Routing and Multicast

- OSPF
- BGP
- BGP Router Reflector*
- RIPv2
- Static routes
- IS-IS
- Multicast (IGMPv3, PIM, SDP, DVMRP, source-specific)
- MPLS
- IPv6 Multicast Listener Discovery (MLD)

IP Address Management

- Static
- DHCP (client and server)
- DHCP relay

Encapsulations

- Ethernet (MAC and tagged)
- PPP (synchronous)
- Frame Relay
- HDLC
- Serial (RS-232, RS-449, X.21, V.35, EIA-530)
- 802.1q support
- MLPPP
- MLFR (FRF.15, FRF.16)
- PPPoE
- Data-link switching (DLSw)

Operating System

All J-series routers ship with the worldwide version of JUNOS software, which has standard encryption, as opposed to the US and Canada version, which has strong encryption. You can download the strong encryption version at no charge so long as you can certify eligibility. The download is available from Juniper's Customer Support Center Web site: <https://www.juniper.net/customers/csc/software/>.

Feature Licenses

Licenses are required to operate the J-Flow Accounting and Advanced BGP features on Juniper Networks J-series routers. To acquire licenses, order JX-JFlow-ADV-LTU (for J-Flow Accounting) or JX-BGP-ADV-LTU (for Advanced BGP). Each license is good for one chassis.

Traffic Management

- Marking, policing, and shaping
- Class-based queuing with prioritization
- WRED
- Queuing based on VLAN, DLCI, interface, bundles, or filters

Security

- Network attack detection
- DoS and DDoS protections (anomaly-based)
- Tunnels (GRE, IP-in-IP, IPSec)
- DES (56-bit), 3DES (168-bit), AES (256-bit) encryption
- MD5 and SHA-1 authentication
- Prevent replay attack
- Stateful firewall filters

Voice Transport

- FRF.12
- Link fragmentation and interleaving (LFI)
- Compressed Real-Time Transport Protocol (CRTP)

High Availability

- VRRP
- Dial backup

IPv6

- OSPFv3
- Multicast Listener Discovery (MLD)
- BGP
- QoS
- IPv4 tunneling
- 6PE

Specifications (cont'd)

MPLS

- Layer 2 VPN
- Layer 3 VPN
- LDP
- RSVP
- Circuit Cross-connect (CCC)
- Translational Cross-connect (TCC)

System Management

- Juniper Networks JUNOScope Manager
- Juniper Networks J-Web browser interface
- Juniper Networks Service Deployment System™ (SDX)
- Juniper Networks JUNOScript™ XML API
- Juniper Networks JUNOS command-line interface (console, telnet, SSH)
- SNMPv2 and SNMPv3

SLA and Measurement

- Real-time performance monitoring
- Top talkers (sessions, packets, bandwidth usage)
- J-Flow flow monitoring and accounting services*

Logging and Monitoring

- Syslog
- Traceroute

Administration

- External administrator database (RADIUS, LDAP, SecureID)
- Auto configuration
- Configuration rollback
- Rescue configuration with button
- Commit confirm for changes
- Auto record for diagnostics
- Software upgrades

Certifications

- ETSI EN-300386-2 Telecommunication Network Equipment Electromagnetic Compatibility Requirements

Product Comparison

Specification	J2320	J2350	J4350	J6350
Maximum Performance and Capacity				
JUNOS software version support	JUNOS software 9.1	JUNOS software 9.1	JUNOS software 9.1	JUNOS software 9.1
Firewall performance (Large packets)	600 Mbps	750 Mbps	1.6 Gbps	2 Gbps
Firewall performance (IMIX)	400 Mbps	500 Mbps	600 Mbps	1 Gbps
Firewall + Routing PPS (64 Byte)	175000 pps	200000 pps	225000 pps	400000 pps
AES256+SHA-1 VPN performance	140 Mbps	160 Mbps	600 Mbps	1 Gbps
3DES+SHA-1 VPN performance	140 Mbps	160 Mbps	600 Mbps	1 Gbps
Maximum concurrent sessions (512 MB / 1GB DRAM)	512 MB / 1 GB DRAM 64 K / 128 K	512 MB / 1 GB DRAM 64 K / 128 K	512 MB / 1 GB DRAM 64 K / 128 K	1 GB / 2 GB DRAM 256 K / 256 K
New sessions/second	5,000	5,000	10,000	20,000
Maximum security policies	2048 (1 GB DRAM)	2048 (1 GB DRAM)	5192 (1 GB DRAM)	10384 (2 GB DRAM)
Firewall				
Network attack detection	Yes	Yes	Yes	Yes
DoS and DDoS protection	Yes	Yes	Yes	Yes
TCP reassembly for fragmented packet protection	Yes	Yes	Yes	Yes
Brute force attack mitigation	Yes	Yes	Yes	Yes
SYN cookie protection	Yes	Yes	Yes	Yes
Zone-based IP spoofing	Yes	Yes	Yes	Yes
Malformed packet protection	Yes	Yes	Yes	Yes
Voice over IP (VoIP) Security				
H.323 ALG	Yes	Yes	Yes	Yes
SIP ALG	Yes	Yes	Yes	Yes
MGCP ALG	Yes	Yes	Yes	Yes
SCCP ALG	Yes	Yes	Yes	Yes
NAT for VoIP protocols	Yes	Yes	Yes	Yes

*Requires additional license; see Ordering Information on page 11 for more information

Product Comparison (cont'd)

Specification	J2320	J2350	J4350	J6350
Routing				
BGP instances	20	25	30	30
BGP peers	512 MB / 1 GB DRAM 40 / 40	512 MB / 1 GB DRAM 40 / 40	512 MB / 1 GB DRAM 40 / 40	1GB / 2 GB 40 / 40
BGP routes	512 MB / 1 GB DRAM 100 K / 300 K	512 MB / 1 GB DRAM 100 K / 300 K	512 MB / 1 GB DRAM 100 K / 300 K	1GB / 2 GB 100 K / 500 K
OSPF instances	20 / 20	25 / 25	30 / 30	30 / 30
OSPF routes	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	1 GB DRAM 10 K
RIP v1/v2 instances	20 / 20	25 / 25	30 / 30	30 / 30
RIP v2 routes	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	1 GB DRAM 10 K
Static routes	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	512 MB / 1 GB DRAM 5 K / 10 K	1 GB DRAM 10 K
Source-based routing	Yes	Yes	Yes	Yes
Policy-based routing	Yes	Yes	Yes	Yes
ECMP	Yes	Yes	Yes	Yes
Multicast	Yes	Yes	Yes	Yes
Reverse Path Forwarding (RPF)	Yes	Yes	Yes	Yes
IGMP (v1, v2, v3)	Yes	Yes	Yes	Yes
PIM SM	Yes	Yes	Yes	Yes
PIM SSM	Yes	Yes	Yes	Yes
Multicast inside IPsec tunnel	Yes	Yes	Yes	Yes
IPsec VPN				
Concurrent VPN tunnels (512 MB / 1 GB DRAM)	512 MB / 1 GB DRAM 256 / 512	512 MB / 1 GB DRAM 256 / 512	512 MB / 1 GB DRAM 256 / 512	1 GB / 2 GB DRAM 512 / 1024
Tunnel interfaces	512 MB / 1 GB DRAM 256 / 512	512 MB / 1 GB DRAM 256 / 512	512 MB / 1 GB DRAM 256 / 512	1 GB / 2 GB DRAM 512 / 1024
DES (56-bit), 3DES (168-bit) and AES (256-bit)	Yes	Yes	Yes	Yes
MD-5 and SHA-1 authentication	Yes	Yes	Yes	Yes
Manual key, IKE, PKI (X.509)	Yes	Yes	Yes	Yes
Perfect forward secrecy (DH Groups) (512M / 1GB DRAM)	Yes	Yes	Yes	Yes
Prevent replay attack	Yes	Yes	Yes	Yes
Remote access VPN	Yes	Yes	Yes	Yes
L2TP within IPsec	No	No	No	No
IPsec NAT traversal	Yes	Yes	Yes	Yes
Redundant VPN gateways	Yes	Yes	Yes	Yes
User Authentication and Access Control				
Built-in (internal) database - user limit				
Third-party user authentication	RADIUS, RSA, SecureID, LDAP	RADIUS, RSA, SecureID, LDAP	RADIUS, RSA, SecureID, LDAP	RADIUS, RSA, SecureID, LDAP
RADIUS Accounting	Yes	Yes	Yes	Yes
XAUTH VPN authentication	Yes	Yes	Yes	Yes
Web-based authentication	Yes	Yes	Yes	Yes
802.1X authentication (JUNOS software 9.2)	Yes	Yes	Yes	Yes
PKI Certificate requests (PKCS 7 and PKCS 10)	Yes	Yes	Yes	Yes
Certificate Authorities supported	VeriSign, Entrust, Microsoft, RSA Keon, iPlanet, (Netscape), Baltimore, DoD PKI	VeriSign, Entrust, Microsoft, RSA Keon, iPlanet, (Netscape), Baltimore, DoD PKI	VeriSign, Entrust, Microsoft, RSA Keon, iPlanet, (Netscape), Baltimore, DoD PKI	VeriSign, Entrust, Microsoft, RSA Keon, iPlanet, (Netscape), Baltimore, DoD PKI

Product Comparison (cont'd)

Specification	J2320	J2350	J4350	J6350
Virtualization				
Maximum number of security zones	40	50	50	50
Maximum number of virtual routers	20	25	30	30
Bridge groups*	Yes	Yes	Yes	Yes
Maximum number of VLANs	256	256	512	1024
Encapsulations				
PPP	Yes	Yes	Yes	Yes
MLPPP	Yes	Yes	Yes	Yes
MLPPP max physical interfaces	6	10	12	12
Frame Relay	Yes	Yes	Yes	Yes
MLFR (FRF .15, FRF .16)	Yes	Yes	Yes	Yes
MLFR max physical interfaces	6	10	12	12
HDLC	Yes	Yes	Yes	Yes
Mode of Operation				
Layer 2 (transparent) mode(5)	No	No	No	No
Layer 3 (route and/or NAT) mode	Yes	Yes	Yes	Yes
Address Translation				
Network Address Translation (NAT)	Yes	Yes	Yes	Yes
Port Address Translation (PAT)	Yes	Yes	Yes	Yes
Policy-based NAT/PAT	Yes	Yes	Yes	Yes
Mapped IP	Yes	Yes	Yes	Yes
Virtual IP	Yes	Yes	Yes	Yes
MIP/VIP Grouping	Yes	Yes	Yes	Yes
IP Address Assignment				
Static	Yes	Yes	Yes	Yes
DHCP, PPPoE client	Yes	Yes	Yes	Yes
Internal DHCP server	Yes	Yes	Yes	Yes
DHCP relay	Yes	Yes	Yes	Yes
Traffic Management Quality of Service (QoS)				
Guaranteed bandwidth	Yes	Yes	Yes	Yes
Maximum bandwidth	Yes	Yes	Yes	Yes
Ingress traffic policing	Yes	Yes	Yes	Yes
Priority-bandwidth utilization	Yes	Yes	Yes	Yes
DiffServ marking	Yes	Yes	Yes	Yes
High Availability				
Active/Active - L3 mode	Yes	Yes	Yes	Yes
Active/Passive - L3 mode	Yes	Yes	Yes	Yes
Configuration synchronization	Yes	Yes	Yes	Yes
VRRP	Yes	Yes	Yes	Yes
Session synchronization for firewall and VPN	Yes	Yes	Yes	Yes
Session failover for routing change	Yes	Yes	Yes	Yes
Device failure detection	Yes	Yes	Yes	Yes
Link failure detection	Yes	Yes	Yes	Yes
Network Connectivity				
Fixed I/O	4x 10/100/1000	4x 10/100/1000	4x 10/100/1000	4x 10/100/1000
Maximum PIM slots	3	5	6	6
Maximum EPIM slots	0	0	2	4
WAN interface options	See WAN and LAN Module Part Numbers, page 12			
LAN interface options	See WAN and LAN Module Part Numbers, page 12			

Product Comparison (cont'd)

Specification	J2320	J2350	J4350	J6350
Flash and Memory				
Memory minimum and maximum (DRAM)	512 MB, 1 GB	512 MB, 1 GB	512 MB, 2 GB	1GB, 2 GB
Memory slots	4	4	4	4
Compact flash minimum and maximum	512 MB, 1 GB	512 MB, 1 GB	512 MB, 1 GB	512 MB, 1 GB
USB port for external storage	Yes	Yes	Yes	Yes
Dimensions and Power				
Dimensions (W x H x D)	17.5 x 1.75 x 15.1 in (445 x 44 x 383 mm)	17.5 x 1.75 x 15.1 in (445 x 44 x 383 mm)	17.5 x 3.5 x 21.5 in (445 x 89 x 546 mm)	17.5 x 3.5 x 21.5 in (445 x 89 x 546 mm)
Weight	15 lb (6.8 kg) No interface modules, 16.6 lb (7.6 kg) 3 interface modules	16 lb (7.3 kg) No interface modules, 19 lb (8.6 kg) 5 interface modules	23 lb (10.4 kg) No interface modules, 25.3 lb (11.5 kg) 6 interface modules,	25 lb (11.3 kg) No interface modules, 1 power supply 30.7 lb (13.9 kg) 6 interface modules, 2 power supplies
Rack mountable	Yes, 1 RU	Yes, 1.5 RU	Yes, 2 RU	Yes, 2 RU
Power supply (AC)	100–240 VAC, 275 W	100–240 VAC, 300 W	100–240 VAC, 350 W	100–240 VAC, 420 W
Average power consumption	80 W	80 W	143 W	166 W
Input frequency	47–63 Hz	47–63 Hz	47–63 Hz	47–63 Hz
Maximum current consumption	3.2 A @ 100 VAC	3.5 A @ 90 VAC	5.7 A @ 100 VAC	5.7 A @ 90 VAC
Maximum inrush current	42 A	32 A	32 A	30 A
Average heat dissipation	273 BTU/hour	273 BTU/hour	488 BTU/hour	566 BTU/hour
Maximum heat dissipation	1091 BTU/hour	1195 BTU/hour	1070 BTU/hour	1145 BTU/hour
Power supply (DC)	–	-48 to -60 VDC, 300 W	-48 to -60 VDC, 420 W	-48 to -60 VDC, 420 W
Redundant power supply (hot swappable)	No	No	No	Yes
Noise level	40.0 dB	59.2 dB	59.3 dB	61.2 dB
Certifications				
Safety certifications	UL, CUL, CSA, CB	UL, CUL, CSA, CB	UL, CUL, CSA, CB	UL, CUL, CSA, CB
EMC Certifications	FCC class B, CE class A, C-Tick, VCCI class B	FCC class B, CE class A, C-Tick, VCCI class B	FCC class B, CE class A, C-Tick, VCCI class B	FCC class B, CE class A, C-Tick, VCCI class A
Environment				
Operational temperature	32°–122° F, (0°–50° C)	32°–122° F, (0°–50° C)	32°–122° F, (0°–50° C)	32°–122° F, (0°–50° C)
Nonoperational temperature	4°–158° F, (-20°–70° C)	4°–158° F, (-20°–70° C)	4°–158° F, (-20°–70° C)	4°–158° F, (-20°–70° C)
Humidity	10%–90% noncondensing	10%–90% noncondensing	10%–90% noncondensing	10%–90% noncondensing
Mean time between failures (Bellcore model)	7.2 years	6.8 years	7.6 years	12 years with redundant power
Other	—	NEBS Level 3	NEBS Level 3	NEBS Level 3

Performance-Enabling Services and Support

Juniper Networks is the leader in performance-enabling services and support, which are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to bring revenue-generating capabilities online faster so you can realize bigger productivity gains, faster rollouts of new business models and ventures, and greater market reach, while generating higher levels of customer satisfaction. At the same time, Juniper Networks ensures operational excellence by optimizing your network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/products_and_services

Ordering Information

The following tables outline part numbers for J6350, J4350, J2350, and J2320 base systems and options; associated WAN and LAN modules; and additional accessories.

J6350 Part Numbers

J6350 Base System	J6350 Options
<p>Available Models</p> <ul style="list-style-type: none"> J-6350-JB (AC with hardware encryption acceleration) J-6350-JB-N (AC NEBS compliant with hardware encryption acceleration) J-6350-JB-DC-N (DC NEBS compliant with hardware encryption acceleration) <p>Default Configuration</p> <ul style="list-style-type: none"> Modular chassis with 6 slots (2 PIM slots, and 4 EPIM/PIM slots) for interface modules (PIMs or EPIMs) 4 fixed 10/100/1000 ports DC or AC power supply with region-specific power cord (optional redundant power supply can be ordered) 1 GB DRAM 512 MB primary compact flash; no secondary compact flash JUNOS software worldwide version 	<p>Interface Modules</p> <p>Various choices; see page 12</p> <p>Redundant Power Supply</p> <ul style="list-style-type: none"> DC Supply (SSG-PS-DC) AC Supply (SSG-PS-AC) <p>Region-Specific AC Power Cables for SSG-PS-AC</p> <ul style="list-style-type: none"> CBL-JX-PWR-AU (Australia) CBL-JX-PWR-CH (China) CBL-JX-PWR-EU (Europe) CBL-JX-PWR-IT (Italy) CBL-JX-PWR-JP (Japan) CBL-JX-PWR-UK (United Kingdom) CBL-JX-PWR-US (USA) <p>Additional DRAM</p> <p>2 GB (2 x JXX50-MEM-512M-S, added to default)</p> <p>Primary Compact Flash (replaces default)</p> <ul style="list-style-type: none"> 512 MB (JX-CF-512M-S) 1 GB (JX-CF-1G-S) <p>Additional Software Feature Licenses</p> <ul style="list-style-type: none"> Advanced BGP (JX-BGP-ADV-LTU) J-Flow Accounting (JX-JFlow-LTU)

J4350 Part Numbers

J4350 Base System	J4350 Options
<p>Available Models</p> <ul style="list-style-type: none"> J-4350-JB-SC (AC without hardware encryption acceleration) J-4350-JB (AC with hardware encryption acceleration) J-4350-JB-N (AC NEBS compliant with hardware encryption acceleration) J-4350-JB-DC-N (DC NEBS compliant with hardware encryption acceleration) <p>Default Configuration</p> <ul style="list-style-type: none"> Modular chassis with 6 slots (4 PIM slots and 2 EPIM/PIM slots) for interface modules (PIMs or EPIMs) 4 fixed 10/100/1000 ports AC or DC power supply and region-specific power cord 1 GB DRAM (512 MB DRAM on J-4350-JB-SC) 512 MB primary compact flash; no secondary compact flash JUNOS software worldwide version 	<p>Interface Modules</p> <ul style="list-style-type: none"> Various choices; see page 12 Cryptographic Acceleration Module, to be used with J-4350-JB-SC only (JXH-HC-S) <p>Additional DRAM</p> <p>(DRAM upgrades must be installed in matching pairs)</p> <p>For J4350 without encryption acceleration:</p> <ul style="list-style-type: none"> 512 MB (JXX50-MEM-256M-S, added to default) 1 GB (2 x JXX50-MEM-512M-S, replaces default) 2 GB (4 x JXX50-MEM-512M-S, replaces default) <p>For J4350 models with encryption acceleration:</p> <ul style="list-style-type: none"> 2 GB (2 x JXX50-MEM-512M-S, added to default) <p>Primary Compact Flash (replaces default)</p> <ul style="list-style-type: none"> 512 MB (JX-CF-512M-S) 1 GB (JX-CF-1G-S) <p>Additional Software Feature Licenses</p> <ul style="list-style-type: none"> Advanced BGP (JX-BGP-ADV-LTU) J-Flow Accounting (JX-JFlow-LTU)

WAN and LAN Module Part Numbers (cont'd)

J2350 Part Numbers

J2350 Base System	J2350 Options
<p>Available Models</p> <ul style="list-style-type: none"> J2350-JB-SC - J2350, JUNOS software, Base Memory (512 MB), software encryption, AC power supply J2350-JH - J2350, JUNOS software, High Memory (1 GB), hardware encryption, AC power supply J2350-JB-SC-N-TAA - J2350, JUNOS software, Base Memory (512 MB), software encryption, AC Power Supply, NEBS, TAA J2350-JH-N-TAA - J2350, JUNOS software, High Memory (1 GB), hardware encryption, AC power supply, NEBS, TAA J2350-JH-DC-N-TAA - J2350, JUNOS software, High Memory (1 GB), hardware encryption, DC power supply, NEBS, TAA <p>Default Configuration</p> <ul style="list-style-type: none"> Modular chassis with 5 slots for interface modules (PIMs) 4 fixed 10/100/1000 ports AC or DC power supply and region-specific power cord 1 GB DRAM (512 MB DRAM on J2350-JB-SC) 512 MB primary compact flash with secondary external compact flash slot JUNOS software worldwide version 	<p>Interface Modules</p> <ul style="list-style-type: none"> Various choices; see page 12 Cryptographic Acceleration Module, to be used with J2350-JB-SC only (JXH-HC2-S) <p>Additional DRAM (DRAM upgrades must be installed in matching pairs)</p> <p>For J2350 without encryption acceleration:</p> <ul style="list-style-type: none"> 1 GB (2 x J-MEM-512M-S replaces default) <p>Primary Compact Flash (replaces default)</p> <ul style="list-style-type: none"> 512 MB (JX-CF-512M-S) 1 GB (JX-CF-1G-S) <p>Additional Software Feature Licenses</p> <ul style="list-style-type: none"> Advanced BGP (JX-BGP-ADV-LTU) J-Flow Accounting (JX-JFlow-LTU)

J2320 Part Numbers

J2320 Base System	J2350 Options
<p>Available Models</p> <ul style="list-style-type: none"> J2320-JB-SC - J2320, JUNOS software, Base Memory (512 MB), SW Encryption, AC power supply J2320-JH - J2320, JUNOS software, High Memory (1 GB), hardware encryption, AC power supply <p>Default Configuration</p> <ul style="list-style-type: none"> Modular chassis with 3 slots for interface modules (PIMs) 4 fixed 10/100/1000 ports AC power supply and region-specific power cord 1 GB DRAM (512 MB DRAM on J2320-JB-SC) 512 MB primary compact flash with secondary external compact flash slot JUNOS software worldwide version 	<p>Interface Modules</p> <ul style="list-style-type: none"> Various choices – see page 12 Cryptographic Acceleration Module, to be used with J2320-JB-SC only (JXH-HC2-S) <p>Additional DRAM (DRAM upgrades must be installed in matching pairs)</p> <p>For J2350 without encryption acceleration:</p> <ul style="list-style-type: none"> 1 GB (2 x J-MEM-512M-S replaces default) <p>Primary Compact Flash (replaces default)</p> <ul style="list-style-type: none"> 512 MB (JX-CF-512M-S) 1 GB (JX-CF-1G-S) <p>Additional Software Feature Licenses</p> <ul style="list-style-type: none"> Advanced BGP (JX-BGP-ADV-LTU) J-Flow Accounting (JX-JFlow-LTU)

WAN and LAN Module Part Numbers

Part Number	Description	Supported on J2320, J2350	Supported on J4350, J6350
Physical Interface Module (PIM)			
JX-1DS3-S	1-Port DS3 PIM	No	Yes
JX-1E3-S	1-Port E3 PIM	No	Yes
JX-2T1-RJ48-S	2-Port T1 PIM	Yes	Yes
JX-2E1-RJ48-S	2-Port E1 PIM	Yes	Yes
JX-2CT1E1-RJ45-S	2-Port Channelized T1/E1 PIM	Yes	Yes
JX-2Serial-1SL-S	2-Port Synchronous Serial PIM	Yes	Yes
JX-2FE-TX-S	2-Port FE PIM	No	Yes
JX-4BRI-S-S	4-Port ISDN BRI – S Interface	Yes	Yes
JX-4BRI-U-S	4-Port ISDN BRI – U Interface	Yes	Yes
JX-1ADSL-A-S	1-Port ADSL Annex A PIM	Yes	Yes
JX-1ADSL-B-S	1-Port ADSL Annex B PIM	Yes	Yes
JX-2SHDSL-S	2-Port 2-wire or 1-Port 4-wire G.SHDSL Interface	Yes	Yes
JX-1DS3-S	1-Port DS3 PIM	No	Yes
Enhanced Physical Interface Module (EPIM)			
JXE-1GE-TX-S	1-Port Gigabit Copper EPIM	No	Yes
JXE-1GE-SFP-S	1-Port Gigabit SFP EPIM	No	Yes
JXE-4FE-TX-S	4-Port FE EPIM	No	Yes

Part Number	Description	Supported on J2320, J2350	Supported on J4350, J6350
Universal Physical Interface Module (UPIM)			
JXU-6GE-SFP-S	6-Port SFP Gigabit Ethernet Universal PIM, SFPs sold separately	Yes	Yes
JXU-8GE-TX-S	8-Port Gigabit Ethernet 10/100/1000 Copper Universal PIM	Yes	Yes
JXU-16GE-TX-S	16-Port Gigabit Ethernet 10/100/1000 Copper Universal PIM	Yes	Yes
JXU-1SFP-S	1-Port SFP 100 Mbps or Gigabit Ethernet Universal PIM (SFP sold separately)	Yes	Yes

Integrated Services Modules PIM

Integrated Service Module PIM	Description	Minimum JUNOS Software	
		J2320/J2350	J4350/J6350
JX-ISM-200-WXC	WXC Integrated Services Module	JUNOS 9.1	JUNOS 9.1

Avaya Telephony Gateway Modules and Telephony Interface Modules

Avaya Part Number	Description	Minimum JUNOS Software	
		J2320/J2350	J4350/J6350
700406978	TGM550 - Media Gateway Module	JUNOS 9.1	JUNOS 9.1
700396138	TIM510 T1/E1 Media Module	JUNOS 9.1	JUNOS 9.1
700396146	TIM514 Analog 4+4 Media Module	JUNOS 9.1	JUNOS 9.1
700396153	TIM 521 BRI Media Module	JUNOS 9.1	JUNOS 9.1
700436645	TGM550-20 Media Gateway Module	JUNOS 9.1	JUNOS 9.1
700436652	TGM550-10 Media Gateway Module	JUNOS 9.1	JUNOS 9.1
700426786	TIM508 Analog 8FXS Media Module	JUNOS 9.1	JUNOS 9.1
700426794	TIM516 Analog 16FXS Media Module	JUNOS 9.1	JUNOS 9.1
700426786	TIM518 Analog 8FXS+8FXO Media Module	JUNOS 9.1	JUNOS 9.1

*Avaya Telephony Gateway Modules and Telephony Interface Modules are available through Avaya resellers and partners.

Small Form Pluggable (SFP) Modules

The one-port 100 Mbps or Gigabit Ethernet Universal PIM and the six-port SFP Gigabit Ethernet Universal PIM require an SPF module to provide the physical interface. The SFP must be ordered separately from the UPIM.

Part Number	Description
JX-SFP-1GE-LX	SFP 1000Base-LX Gigabit Optical Transceiver SFP Module
JX-SFP-1GE-SX	SFP 1000Base-SX Gigabit Optical Transceiver SFP Module
JX-SFP-1GE-T	SFP 1000Base-T Gigabit Copper Transceiver SFP Module
JX-SFP-1FE-FX	SFP 100Base-FX Optical Transceiver Module (JXU-1SFP-S only)

Serial Interface Cables

The two-port Serial PIM requires separate purchase of serial cables.

Part Number	Cable Type	Length	Connector Type
JX-CBL-EIA530-DCE	EIA530 cable (DCE)	10 ft (3 m)	Female
JX-CBL-EIA530-DTE	EIA530 cable (DTE)	10 ft (3 m)	Male
JX-CBL-RS232-DCE	RS232 cable (DCE)	10 ft (3 m)	Female
JX-CBL-RS232-DTE	RS232 cable (DTE)	10 ft (3 m)	Male
JX-CBL-RS449-DCE	RS449 cable (DTE)	10 ft (3 m)	Female
JX-CBL-RS449-DTE	RS449 cable (DTE)	10 ft (3 m)	Male
JX-CBL-V35-DCE	V.35 cable (DTE)	10 ft (3 m)	Female
JX-CBL-V35-DTE	V.35 cable (DTE)	10 ft (3 m)	Male
JX-CBL-X21-DCE	X.21 cable (DCE)	10 ft (3 m)	Female
JX-CBL-X21-DTE	X.21 cable (DTE)	10 ft (3 m)	Male

About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at www.juniper.net.



CORPORATE HEADQUARTERS
AND SALES HEADQUARTERS FOR
NORTH AND SOUTH AMERICA
Juniper Networks, Inc.
1194 North Mathilda Avenue
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or 408.745.2000
Fax: 408.745.2100
www.juniper.net

EUROPE, MIDDLE EAST, AFRICA
REGIONAL SALES HEADQUARTERS
Juniper Networks (UK) Limited
Building 1
Aviator Park
Station Road
Addlestone
Surrey, KT15 2PG, U.K.
Phone: 44.(0).1372.385500
Fax: 44.(0).1372.385501

EAST COAST OFFICE
Juniper Networks, Inc.
10 Technology Park Drive
Westford, MA 01886-3146 USA
Phone: 978.589.5800
Fax: 978.589.0800

ASIA PACIFIC REGIONAL SALES HEADQUARTERS
Juniper Networks (Hong Kong) Ltd.
26/F, Cityplaza One
1111 King's Road
Taikoo Shing, Hong Kong
Phone: 852.2332.3636
Fax: 852.2574.7803

Copyright 2008 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. JUNOS and JUNOSe are trademarks of Juniper Networks, Inc. All other trademarks, service marks, registered trademarks, or registered service marks are the property of their respective owners. Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

100206-005 Aug 2008

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