



E SERIES BROADBAND SERVICES ROUTERS

Product Overview

Broadband edge networks must provide reliable and scalable high performance to meet stringent service level agreements and elevated customer expectations associated with Internet access, IPTV, video on demand, voice over IP (VoIP) and interactive applications. Juniper Networks E Series Broadband Services Routers flexibly address these diverse and demanding business and technical requirements while concurrently helping to control operational costs. More than 200 of the largest Service Providers worldwide rely on the extensive broadband service capabilities and overall reliability of E Series platforms to create, deliver and manage services at the network edge.

Product Description

Service providers depend on Juniper Networks® E Series Broadband Services Routers (BSRs) to support high-speed Internet access, IPTV, video on demand, voice over IP (VoIP), online gaming, and a host of interactive applications. The E Series consists of broadband-optimized platforms that offer the carrier-class reliability, availability, scale, and performance needed for business and residential services alike.

To accomplish this, all E Series platforms are designed with a multi-processor hardware-assisted packet forwarding architecture that efficiently provides incremental processing power as subscriber density increases. This distributed design ensures that service quality is maintained for both traditional services and emerging multiplay applications, even at peak traffic loads and with multiple services concurrently enabled.

In addition to this high-performance architecture, the entire E Series family is powered by a single consistent release of Juniper Networks JunosE™ operating system, a modular, object-oriented and component-based operating system that increases system reliability and simplifies software upgrades. The consistent implementation of JunosE OS across the entire E Series allows service providers to select the platforms that best address their business and technical needs based on system capacity, subscriber density and redundancy options, without compromising on reliability or feature set.

JunosE OS provides a comprehensive set of subscriber management capabilities that are complimented with the robust, world class routing features that customers expect from Juniper, including comprehensive implementations of MPLS, BGP4, IS-IS, OSPF and RIP. JunosE OS also provides advanced native IPv6 support for fast-path forwarding and routing, packet classification, policy, hierarchical QoS, subscriber management, tunneling, and Denial of Service (DoS) attack prevention. Importantly, JunosE OS concurrently supports a sophisticated IPv4 and IPv6 “dual stack” implementation, permitting concurrent IPv4 and IPv6 operation.

JunosE OS incorporates a complete set of operational features, such as “zero-touch” provisioning, policy-driven service control, and bulk circuit pre-provisioning, which simplify and automate the operations environment. JunosE OS is also fully integrated with Juniper Networks Identity and Policy Management portfolio, enabling the rapid, automated deployment of broadband services at carrier scale, as well as dynamic network resource modification in response to application requirements, subscriber requests and operator policies.

In summary, the E Series integrates carrier-class, wire-speed routing with comprehensive subscriber management, sophisticated QoS, and policy-based automation to efficiently meet the demanding broadband edge requirements.

Product Description

The E120 and E320 are advanced broadband service routing platforms designed for demanding multiplay applications and complex service bundles. Both platforms support redundant route processing and switch fabric modules, and all common components are hot-swappable without service interruption. The E120 and E320 share many components, including line modules and interface modules (Input-Output Adapters or IOAs), making sparing easier in mixed platform networks.

- The E120 is a high-performance Broadband Services Router optimized for small to medium-size points of presence (PoPs) and central offices. The E120 has a 120 Gbps switch fabric and hosts up to six line modules that support OC3/STM1, OC12-STM4, OC48c/STM16, Gigabit Ethernet and 10-Gigabit Ethernet technologies. The E120 supports both full height and half-height IOAs that permit flexible and efficient physical network connectivity for a wide variety of media types.
- The E320 is a high-performance Broadband Services Router designed for large PoPs. The E320 can be flexibly configured with either a 100 Gbps or a 320 Gbps switch fabric and hosts up to twelve line modules that support OC3/STM1, OC12-STM4, OC48c/STM16, Gigabit Ethernet, and 10-Gigabit Ethernet technologies. The E320 supports both full height and half-height IOAs that permit flexible and efficient physical network connectivity.

There are five platforms that are designed for IP edge and broadband service requirements. The specific model number determines the types of line modules and IOAs supported, and the capacity and number of switch route processor (SRP) modules used.

- The ERX1440 Broadband Services Router is a high-performance router optimized for medium to large edge environments. The ERX1440 has a 40G switch fabric with optional redundancy, 12 line module slots, and supports up to OC48c/STM16 and Gigabit Ethernet interfaces.
- The ERX1410 Broadband Services Router is an edge routing platform optimized for large circuit aggregation applications. The ERX1410 Broadband Services Router has a 10G switch fabric with optional redundancy, 12 line module slots, and supports up to OC12c/STM4 and Gigabit Ethernet interfaces.
- The ERX700 Broadband Services Router series is a compact, routing platform that is optimized for circuit aggregation applications. The ERX700 can be configured with a 5 Gbps or 10 Gbps switch fabric (optional switch fabric redundancy), has five slots for line modules, and supports up to OC12c/STM4 and Gigabit Ethernet interfaces.
- The ERX310 Broadband Services Router is a very compact, high-performance router designed for locations where space is at a premium. The ERX310 has a 10 Gbps switch fabric, two slots dedicated to line modules, and supports up to OC12c/STM4 and Gigabit Ethernet interfaces.

Table 1: Platform Capacity and Interface Support Snapshot

	ERX310	ERX700	ERX1410	ERX1440	E120	E320
Aggregate throughput	10 Gbps	5 Gbps 10 Gbps	10 Gbps	40 Gbps	120 Gbps	100 Gbps 320 Gbps
Chassis per 7 ft rack	14	6	3	3	6	3
Interface support	Channelized T3					
	OC3/STM1 (Channelized, POS)					
	OC3/STM1 (ATM)					
	OC12/STM4 (POS and ATM)					
					OC48/STM16 (POS and ATM)	
	Fast Ethernet					
	Gigabit Ethernet					
					10-Gigabit Ethernet	

E Series platforms support a wide variety of standards-based interfaces that help service providers maintain a consistent operational environment as they migrate from TDM- and ATM-based networks to Ethernet-based networks. With an unsurpassed combination of powerful hardware and advanced software, the E Series provides the performance, scale and “always on” availability required at the network edge. Deployed in hundreds of production networks, the E Series is relied on by service providers worldwide for its predictable high performance and service flexibility. These routers cost-effectively address demanding subscriber management, edge routing and service aggregation requirements at carrier scale.

Architecture and Key Components

Software Components

JunosE OS is a modular operating system that is designed for ease of use and high reliability. Each JunosE OS process independently runs in protected memory space—which prevents issues on individual modules from affecting other modules—and each process can be independently restarted without requiring a system reboot. A single management process oversees all module processes, and efficient APIs provide interfaces between all system components to ensure co-operation between modules. JunosE OS also supports In-Service Software Updates, which allow operators to non-disruptively upload individual modules, and In-Service Software Upgrades (on the E320, E120 and ERX1440), permitting non-service affecting upgrades and downgrades between entire JunosE OS releases.

Features and Benefits

ADVANTAGE	FEATURES	BENEFITS
Performance Optimized for Multiplay Services at Scale	<ul style="list-style-type: none"> High performance multi-processor architecture with ASIC based forwarding and superior multicast handling Enhanced QoS/CoS and traffic engineering features 	Assures customer satisfaction by ensuring the quality delivery of all applications and services, even as subscribers consume multiple services over the same physical connection.
Reliable High Availability for “Always On” Services	<ul style="list-style-type: none"> Redundant hardware (power supplies, routing engines, switch fabrics, line modules) Resilient software (modular operating system, protocol Graceful Restart, in-service software update and in-service software upgrade options) 	Combination of carrier grade architecture, hardware and software provides high service availability to ensure customers stay connected to critical services, which enables service providers to maximize uptime and revenues.
Advanced Operations Features	<ul style="list-style-type: none"> Standard-based northbound interfaces permit integration with a wide range of NMS/OSS platforms Full integration with Juniper Networks Identity and Policy Management products (SRX Series, SDX300, SBR Series) 	The sophisticated capabilities of JunosE OS improves operational efficiency and control, supports new service opportunities and reduces operational complexity via integrated service management and policy-driven service control.

Hardware Components

All E Series platforms share a common modular hardware architecture.

- Switch Route Processors provide the switch fabric and route processor functions. To achieve the highest levels of availability, the E320 and E120 also separate the switch fabric and route processing functions onto separate redundant modules.
- Input/Output adapters provide flexible network connectivity.
- Line modules provide packet processing and forwarding.
- A passive midplane interconnects all system components.



Specifications

For complete platform information, please consult the E Series Hardware Guide at www.juniper.net/techpubs/hardware.

	E120	E320	ERX14XX	ERX7XX	ERX310
Dimensions and Power					
Dimensions (W x H x D)	17.45 x 11.25 x 25.1 in (44.32 x 28.57 x 63.75 cm)	19 x 24.5 x 25 in (48.26 x 62.23 x 63.5 cm)	19 x 22.75 x 16 in (48.26 x 57.78 x 40.64 cm)	19 x 10.5 x 16 in (48.26 x 26.67 x 4 0.64 cm)	19 x 5.2 x 16 in (48.26 x 13.21 x 40.64 cm)
Weight (Chassis only)	51 lb (23.1 kg)	88 lb (39.9 kg)	42 lb (18.9 kg)	22 lb (9.9 kg)	DC Model: 25.5 lb (11.57 kg) AC Model—dual power supply: 31.5 lb (14.29 kg)
Power Input	-40 to -72 VDC 40 A @ -48 VDC	-40 to -72 VDC 80 A @ -48 VDC	-40 to -72 VDC 50 A @ -48 VDC	-40 to -72 VDC 30 A @ -48 VDC	DC Model: -40 to -72 VDC 9 A @ -48 VDC AC Model: 90-265 VAC @ ~5 A
Power Consumption	Typical*: E120: 1638 W	Typical*: E320 (100 Gbps): 3241 W E320 (320 Gbps): 3347 W	Typical*: 2235 W	Typical*: 993 W	Typical*: 559 W

Environment

Operating Temperature (Long term)	41° to 104° F (5° to 40° C)	41° to 104° F (5° to 40° C)	41° to 104° F (5° to 40° C)	41° to 104° F (5° to 40° C)	41° to 104° F (5° to 40° C)
Operating Humidity	Long term: 5% to 85% (noncondensing)	Long term: 5% to 85% (noncondensing)	Long term: 5% to 85% (noncondensing)	Long term: 5% to 85% (noncondensing)	Long term: 5% to 85% (noncondensing)

* System power consumption varies based on system configuration. Represents typical power for fully loaded, redundant configuration.

JunosE OS Specifications

IP Routing

- BGP, IS-IS, OSPF, RIP, MPLS, Virtual Routers; IPv4 and IPv6

Mobility

- Mobile IP Home Agent

Encapsulation Methods

- Dedicated Access role: IP/PPP, IP/FR, IP/ATM, IP/PPP/SONET/SDH (POS), IP/VLAN/ETH
- BSR role: PPPoA/ATM, IP/PPPoE/ATM, PPPoE/ETH, IP/PPPoE/VLAN/ETH | PPP, PPPoE, PPPoA, FR, ATM, Ethernet, IEEE 802.1q VLAN, VLAN stacking, HDLC, POS

L2 Protocols

- PPP, PPPoE, PPPoA, FR, ATM, Ethernet, 802.1q, HDLC, SONET/SDH, VPLS
- ATM Support
- AAL1/2/5, VC queuing, traffic class support, OAM, PVC, SVC, ILMI, VP/VC shaping

Subscriber Management

- L2TP LAC, L2TP LNS, RADIUS AAA, PPP termination, clientless access, DHCP, transparent bridging, IPv4 and IPv6 support
- VPN Support
- MPLS 2547, FR/MPLS Martini, Ethernet/MPLS Martini, ATM/MPLS Martini, IPsec, Virtual Routers, NAT

QoS Support

- 3-tiered hierarchical round-robin queuing (HRR), strict priority queuing, subscriber class-based queuing, DiffServ, EXP, 802.1p

Security

- Filtering, stateful firewall, DoS attack protection, source address and MAC address screening, traffic mirroring

Multicast

- IGMP v1/v2/proxy, PIMv2, DVMRPv3/tunnels, MBGP

Tiered Service

- QoS, ATM QoS, MLPPP, MLFR, rate limiting

Tunneling

- L2TP LAC, L2TP LNS, IPsec, GRE, MPLS

Management

- CLI, SNMPv1/v2/v3, SRC/SDX, COPS, CORBA, OSMINE, TACACS, NTP, Zero-touch provisioning, granular statistics collection, bulk stats transfer, dynamic service activation

For a complete list of supported JunosE OS features, please consult www.juniper.net/techpubs/software/.

E Series Certifications and Approvals

NEBS Certification

- SR-3580 (FD-15)
- GR-63–CORE
- GR-1089 (LSSGR, FD-15)

Safety Agency Certification

- AS/NZS 60950:2000
- CAN/CSA-C22.2, No. 60950-1–03
- EN60825-1
- EN 60950-1:2001
- IEC 60950-1(2001-10)
- Low Voltage Directive (73/23/EEC)
- UL 60950-1

Electromagnetic Emissions Agency Certification

- AS/NZS 3548:1995 (CISPR 22 Class A)
- EMC Directive (89/336/EEC)
- EN55022 Class A (CISPR-22 Class A)
- EN55024, Annex C for WAN Equipment Performance Criteria A, B, C
- ETSI 300-386
- FCC Part 15 Class A
- IECS-03 Issue 3 Class A
- VCCI

For complete platform information, please consult the E Series Hardware Guide at www.juniper.net/techpubs/hardware.

Juniper Networks 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 and faster rollouts of new business models and ventures. 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/us/en/products-services/.

Ordering Information

The following tables provide a partial list of E Series part numbers; please contact your Juniper sales representative for a complete list, as well as for additional information regarding E Series accessories, pluggable interfaces, and JunosE OS products.

E320 BSR and E120 Ordering Information

MODEL NUMBER	DESCRIPTION
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E320 and E120 Base System Options¹

ES2-BSLM6-SYS	6-slot E120 chassis
ES2-BSLM12-SYS	12-slot E320 chassis

E320 and E120 SFM and SRP Options

ES2-100G-SFM	100 Gbps SFM for the E320 only.
ES2-100G-SRP	100 Gbps SRP for the E320 only.
ES2-120G-SFM	120 Gbps SFM for the E120 only.
ES2-120G-SRP	120 Gbps SRP for the E120 only.
ES2-320G-SFM	320 Gbps SFM; supported in the E320 and E120.
ES2-320G-SRP	320 Gbps SRP; supported in the E320 and E120.

E320 and E120 LM Options

ES2-10GACS3-MOD	10 Gbps access line module (LM10A)
ES2-10GACS4-MOD	10 Gbps advanced access line module (Advanced LM10A)
ES2-10GUPS2-MOD	10 Gbps uplink line module (LM10U)
ES2-4GS1-MOD	4 Gbps line module (LM4)

E320 and E120 Service Module

ES2-SERVS1-IOA	Supports highly scalable L2TP LNS and GRE tunnels, as well as Network Address Translation (NAT) and Firewall Services.
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E320 and E120 IOA Options

ES2-10GES1-IOA	Provides a single 10-Gigabit Ethernet port via an XFP interface.
ES2-10GES2-IOA	Provides two 10-Gigabit Ethernet ports (1-active, 1-standby) via XFP interfaces.
ES2-2OC12AS1-IOA	Provides two OC12/STM4 ATM ports via SFP interfaces in a half-slot form factor.
ES2-2OC12PS1-IOA	Provides two OC12/STM4 POS ports via SFP interfaces in a half-slot form factor.
ES2-8OC3AS1-IOA	Provides eight OC3/STM1 ATM ports via SFP interfaces in a half-slot form factor.
ES2-GE20S3-IOA	Provides 20 Gigabit Ethernet ports via SFP interfaces in a half-slot form factor.
ES2-GE8S1-IOA	Provides eight Gigabit Ethernet ports via SFP interfaces in a half-slot form factor.
ES2-OC48PS1-IOA	Provides a single OC48/STM16 POS port via SFP interfaces in a half-slot form factor.
ES2-GE4S1-IOA	Provides four Gigabit Ethernet ports via SFP interfaces.

¹Air Filters, power distribution units and fan trays sold separately.

ERX1440, ERX1410, ERX710, ERX705 and ERX310 Ordering Information

MODEL NUMBER	DESCRIPTION
Base System Options²	
BASE-14	14 slot ERX1400 chassis for 10 Gbps fabric
BASE-1440	14 slot ERX1400 chassis for 40 Gbps fabric
BASE-7	7 slot ERX700 chassis for 5 G or 10 Gbps fabric
EX3-310ACIG-SYS	3 slot ERX310 AC chassis; includes 10 Gbps SRP
EX3-310DCIG-SYS	3 slot ERX310 DC chassis; includes 10 Gbps SRP

SRP Options

ERX-10G2GECC-SRP	10 Gbps SRP for the ERX1410 and ERX710 only
ERX-40G2GEC2-SRP	40 Gbps SRP for the ERX1440 only
ERX-5G2GECC-SRP	5 Gbps SRP for the ERX705 only
EX3-1GSRP-MOD	10 Gbps SRP for the ERX310 only

Line Module Options

Except as noted, all line modules work in all ERXXXX systems.

CT3-12-F0	Supports 12 channelized (DS3, DS1, DS0 with HDLC framing) or 12 unchannelized T3 interfaces.
ERX-UT3E3OCX-MOD	Supports 12 frame based fractional T3 interfaces or 12 E3 frame-based interfaces.
COCX/STMX-F0	Supports 4 channelized (to DS0) OC3/STM1 or 1 channelized (to DS0) OC12/STM4 frame based interface(s).
ERX-O3012A-MOD	Supports 4 OC3/STM1 ATM or 1 OC12/STM4 ATM interface(s).
ERX-O3012P-MOD	Supports 4 OC3/STM1 POS or (1) OC12/STM4 POS interface(s).
ERX-OC48ST16-MOD	Supports a single OC48/STM16 POS interface for the ERX1440 only.
ERX-OCXA256M-MOD	Supports 4 OC3/STM1 ATM or 1 OC12/STM4 ATM or 4 T3/DS3 ATM interface(s).
OC3/OC12-POS	Supports 4 OC3/STM1 POS or 1 OC12/STM4 POS interface(s).
ERX-GEFE256M-MOD	Supports a single Gigabit Ethernet or eight 10/100 Ethernet interfaces.
ERX-GE-MOD	Supports 2 active /2 standby Gigabit Ethernet interfaces. Supported on the ERX310 and ERX1440 only.
ERX-HDE-MOD	Supports the High Density Ethernet IOA and the 2-port Gigabit Ethernet IOA. Supported on the ERX310 and ERX1440 only.
ERX-OCXGE-MOD	Supports the Gigabit Ethernet /ATM Combo IOA.

Service Modules

ERX-IPSECURE-MOD	Supports IPsec services with encryption capabilities.
ERX-SERVICE-MOD	Supports scalable Tunnel services, NAT and firewall capabilities.

MODEL NUMBER	DESCRIPTION
IOA Options	
ERX-4T3ATM-IOA	Provides 4 unchannelized T3/DS3 ports via physical BNC connectors. Works with the ERX-03012A-MOD LM and the ERX-OCXA256M-MOD LM.
T312-F0-F3-I/O	Provides 12 channelized or unchannelized T3 ports via BT43 SMB connections (the ERX-12T3-CBL-ACC converter cable can be used to convert to BNC connections). Works with either the CT3-12-F0 LM or the ERX-UT3E3OCX-MOD LM.
E3-12-F3-I/O	Provides 12 E3 frame-based ports with BT43 SMB connections (the ERX-12T3-CBL-ACC converter cable can be used to convert to BNC connections). Works with the ERXUT3E3OCX-MOD LM.
ERX-OC12MM-A-IOA	Provides 2 OC12/STM4 ports (APS 1-active and 1-standby) via physical multimode SC interfaces. Works with the ERX-03012A-MOD LM and the ERX-OCXA256M-MOD LM.
ERX-OC12SM-A-IOA	Provides 2 OC12/STM4 ports (APS 1-active and 1-standby) via physical single mode SC interfaces. Works with the ERX-03012A-MOD LM and the ERX-OCXA256M-MOD LM.
ERX-OC3M-APS-IOA	Provides 8 OC3/STM1 ports (APS 4-active and 4-standby) via multimode LC interfaces. Works with the ERXOCXA256M-MOD LM, OC3/OC12-ATM LM, and OC3/OC12-POS LM.
ERX-OC3S-APS-IOA	Provides 8 OC3/STM1 ports (APS 4-active and 4-standby) via single mode LC interfaces. Works with the ERXOCXA256M-MOD LM, OC3/OC12-ATM LM, and OC3/OC12-POS LM.
ERX-OC48ST16-IOA	Provides one OC48/STM16 port via an LC interface. Works with the ERX-OC48ST16-MOD LM.
OC12-LH-I/O	Provides one OC12/STM4 port via a single mode SC interface. Works with the OC3/OC12-ATM LM, ERXOCXA256M-MOD LM, and OC3/OC12-POS LM.
OC12-MM-I/O	Provides one OC12/STM4 port via a multimode SC interface. Works with the OC3/OC12-ATM LM, ERXOCXA256M-MOD LM, and OC3/OC12-POS LM.
OC12-SM-I/O	Provides one OC12/STM4 port via a single mode SC interface. Works with the OC3/OC12-ATM LM, ERXOCXA256M-MOD LM, and OC3/OC12-POS LM.
OC3-4LH-I/O	Provides 4 OC3/STM1 ports via single mode SC interfaces. Works with the OC3/OC12-ATM LM, ERX-OCXA256MMOD LM, and OC3/OC12-POS LM.
OC3-4MM-I/O	Provides 4 OC3/STM1 ports via multimode SC interfaces. Works with the OC3/OC12-ATM LM, ERX-OCXA256MMOD LM, and OC3/OC12-POS LM.
OC3-4SM-I/O	Provides 4 OC3/STM1 ports via single mode SC interfaces. Works with the OC3/OC12-ATM LM, ERX-OCXA256MMOD LM, and OC3/OC12-POS LM.
CO12F0-MM-I/O	Provides one channelized OC12/STM4 port via a multimode SC interface. Works with the COCX/STMX-F0 LM.

²Except for the ERX310 air filters, power distribution units, and fan trays are sold separately.

ERX1440, ERX1410, ERX710, ERX705 and ERX310 Ordering Information (continued)

MODEL NUMBER	MODEL NAME AND DESCRIPTION
IOA Options (continued)	
COC12F0-SM-I/O	Provides one channelized OC12/STM4 port via a single mode SC interface. Works with the COCX/STMX-F0 LM.
COC3F0-MM-I/O	Provides 4 channelized OC3/STM1 ports via multimode interfaces. Works with the COCX/STMX-F0 LM.
COC3F0-SM-I/O	Provides 4 channelized OC3/STM1 ports via single mode SC interfaces. Works with the COCX/STMX-F0 LM.
ERX-COC12-LH-IOA	Provides one channelized OC12/STM4 port via a single mode SC interface. Works with the COCX/STMX-F0 LM.
ERX-8FXSFP-IOA	Provides 8 Fast Ethernet interfaces via multimode fiber. Works with the ERX-GEFE256MMOD LM.
FE-8-I/O	Provides 8 Fast Ethernet (10/100) ports via RJ-45 connections. Works with the GE/FE-8 and ERX-GEFE256M-MOD line modules.
ERX-2OC3GE-IOA	Provides 4 OC3 ports (2 active + 2 standby) and 2 Gigabit Ethernet ports (1 active + 1 standby) via SFP interfaces. Works with ERX-OCXGE-MOD LM.
ERX-GIGESFP-IOA	Provides 2 Gigabit Ethernet ports (APS-like 1 active + 1 standby) via SFP interfaces. Works with the GE/FE-8 LM and ERX-GEFE256M-MOD LM.
ERX-2GE-IOA	Provides 4 Gigabit Ethernet ports (2 active + 2 standby) via SFP interfaces. Works with the ERX-GE-MOD LM and the ERX-HDE-MOD LM. Supported on the ERX310 and ERX1440 only.
ERX-8GEHDE-IOA	Provides 8 Gigabit Ethernet ports via SFP interfaces. Works with ERXHDE-MOD LM. Supported on ERX310 and ERX1440 only.

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.

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