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. E Series Broadband Services Routers flexibly address these diverse and demanding business and technical requirements while helping to control operational costs. Hundreds of service providers worldwide continue to rely on the E Series platforms as they migrate to the cutting-edge MX Series 3D Universal Edge Routers with Broadband Network Gateway (BNG) capabilities.

Product Description

Service providers depend on Juniper Networks® E Series Broadband Services Routers 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.

All E Series platforms are designed with a multiprocessor 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 provides a comprehensive set of subscriber management capabilities that are complemented with the robust, world-class routing features that customers expect from Juniper, including comprehensive implementations of MPLS, BGP4, IS-IS, OSPF, and RIP.

The E Series also provides advanced native IPv6 support for fast-path forwarding and routing, packet classification, policy, hierarchical quality of service (QoS), subscriber management, tunneling, and denial-of-service (DoS) attack prevention. Importantly, the E Series concurrently supports a sophisticated IPv4 and IPv6 "dual stack" implementation, permitting concurrent IPv4 and IPv6 operation.

In summary, many service providers worldwide rely on the E Series to meet their broadband edge requirements as they evolve to the MX Series 3D Universal Edge Router with BNG capabilities.

Architecture and Key Components

The E120 and E320 are advanced broadband services routing (BSR) 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 E320 can be flexibly configured with either a 100 Gbps or a 320 Gbps switch fabric and hosts up to 12 line modules, while the E120 has a 120 Gbps switch fabric and hosts up to six line modules. Both the E320 and E120 support OC3/STM1, OC12-STM4, OC48c/STM16, GbE, and 10GbE technologies, as well as both full-height and half-height IOAs that permit flexible and efficient physical network connectivity.

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There are also five ERX Series 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 has a 40 Gbps switch fabric with optional redundancy, 12 line module slots, and supports up to OC48c/STM16 and GbE interfaces.
- The ERX1410 is an edge routing platform optimized for large circuit aggregation applications. The ERX1410 has a 10 Gbps switch fabric with optional redundancy, 12 line module slots, and supports up to OC12c/STM4 and GbE interfaces.
- The ERX700 line is a compact routing platform optimized for circuit aggregation applications. The ERX700 line can be configured with a 5 or 10 Gbps switch fabric (optional switch fabric redundancy), has five slots for line modules, and supports up to OC12c/STM4 and GbE interfaces.
- The ERX310 is a very compact router that has a 10 Gbps switch fabric, two slots dedicated to line modules, and supports up to OC12c/STM4 and GbE interfaces.

Table 1: Platform Capacity and Interface Support Snapshot

	ERX310	ERX705/ ERX710	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		

E320

ERX1440

ERX1410

E120

ERX310

ERX705/ERX710

Specifications

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

	E120	E320	ERX1400 line	ERX700 line	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 40.64 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)	41º to 104º F (5º to 40º C)	41º to 104º F (5º to 40º C)	41º to 104º F (5º to 40º C)	41º to 104º F (5º to 40º C)	41º to 104º F (5º to 40º 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.

Software 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 l 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, L2TP LNS Stateful Failover, 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 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 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
E320 and E120 Base System Options[1]	
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[2]	Supports highly scalable L2TP LNS and GRE tunnels, as well as Network Address Translation (NAT) and Firewall Services.

Model Number	Description
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.

[1]Air filters, power distribution units and fan trays sold separately.

[2]Supports ES2-10GACS4-MOD and ES2-4GS1-MOD (No support for ES2-10GACS3-MOD and ES2-10GUPS2-MOD).

Model Number	Description
Base System Options[2]	
BASE-14	14 slot ERX1410 chassis for 10 Gbps fabric
BASE-1440	14 slot ERX1440 chassis for 40 Gbps fabric
BASE-7	7 slot chassis for ERX700 line for 5 Gbps or 10 Gbps fabric
EX3-310AC1G-SYS	3 slot ERX310 AC chassis; includes 10 Gbps SRP
EX3-310DC1G-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.

Model Number	Description
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-O3O12A-MOD	Supports 4 OC3/STM1 ATM or 1 OC12/STM4 ATM interface(s).
ERX-O3O12P-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.

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

Model Number	Description
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

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

IOA Options

Model Number	Description
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 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 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.

Model Number	Description
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/STM1ports 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.
COC12F0-MM-I/O	Provides one channelized OC12/STM4 port via a multimode SC interface. Works with the COCX/STMX-F0 LM.
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 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.

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