



E320 AND E120 BROADBAND SERVICES ROUTERS

Product Overview

Service Providers face many challenges as they offer increasingly complex multiplay service bundles over their broadband networks. Juniper Networks E320 and E120 Broadband Services Routers provide advanced subscriber management, high-performance routing, efficient Ethernet aggregation, and superior quality of service that address the diverse requirements of the broadband network edge with unprecedented capacity, reliability and performance.

Product Description

Juniper Networks® E Series Broadband Services Routers include the Juniper Networks E320 Broadband Services Router and E120 Broadband Services Router. The E320 provides the high system capacity, high subscriber density and high interface density that is ideal for large broadband edge service aggregation sites. The E120 provides the same comprehensive feature set as the E320 in a form factor that is designed for locations with lower service aggregation requirements. Both the E320 and the E120 share advanced hardware and Juniper Networks JunosE™ operating system that helps service providers reduce operational costs and develop new revenue opportunities via advanced broadband services such as bundled multiplay offerings, voice and high-speed Internet access, IPTV and video conferencing, gaming, and many other multimedia applications.

The E320 and E120 share a sophisticated system architecture that distributes packet processing and quality of service (QoS) policy enforcement functions to ASIC-based line modules. This high performance design provides a 'fast path' for all traffic streams by removing route processing functions from the forwarding path, and ensures cost effective performance at scale by enabling the incremental addition of processing power to the system as new subscribers and services are provisioned.

The E320 and E120 also share a modular, carrier-class design with optional redundancy on all major hardware subsystems and common equipment—this includes power and cooling, switch fabric, route processing, and packet processing redundancy—as well as a variety of interface card and interface-level protection schemes. Furthermore, both platforms are powered by JunosE OS, a modular, object-oriented, and component-based operating system that increases system reliability, simplifies operations, and accelerates new feature development. JunosE OS also supports an extensive set of high availability features, such as Unified In Service Software Upgrade and Stateful Control Plane (SRP) switchover.

Together with JunosE OS, the E320 and E120 incorporate the vast operational experience Juniper has gained over many years of supporting cutting edge broadband service deployments for both residential and business services; in fact, more than 200 service providers worldwide depend on the E Series and JunosE OS to support many tens of millions of broadband subscribers every day.

Architecture and Key Components

The E320 is a high-performance routing platform optimized for multiplay service delivery in large point of presence (POP) environments. Service providers can optionally equip the E320 with either a 100 Gbps or a 320 Gbps switch fabric, based on their specific bandwidth requirements.

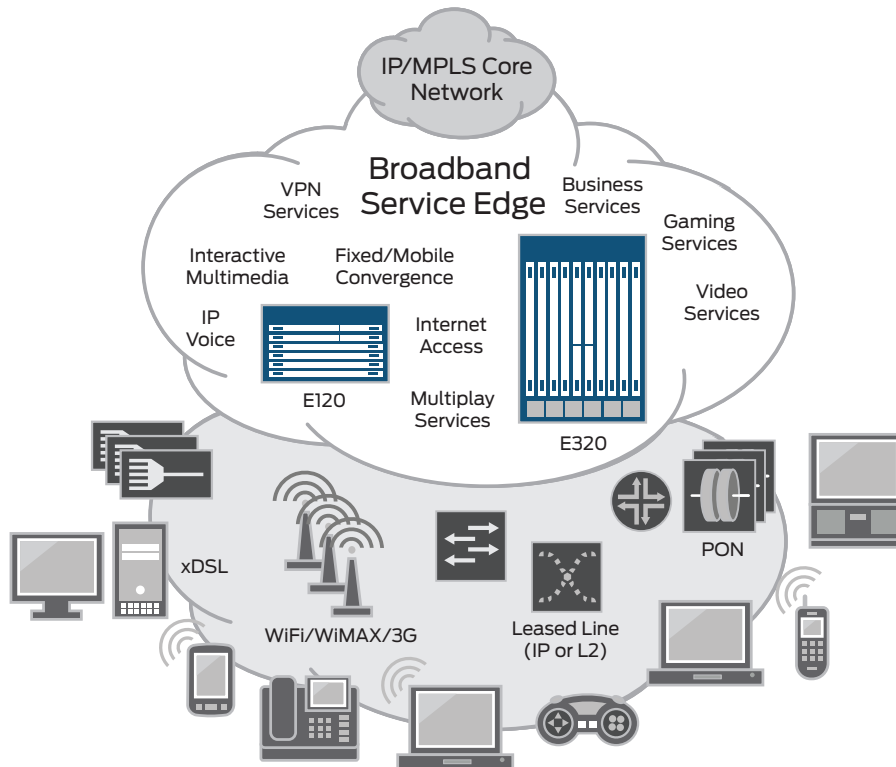
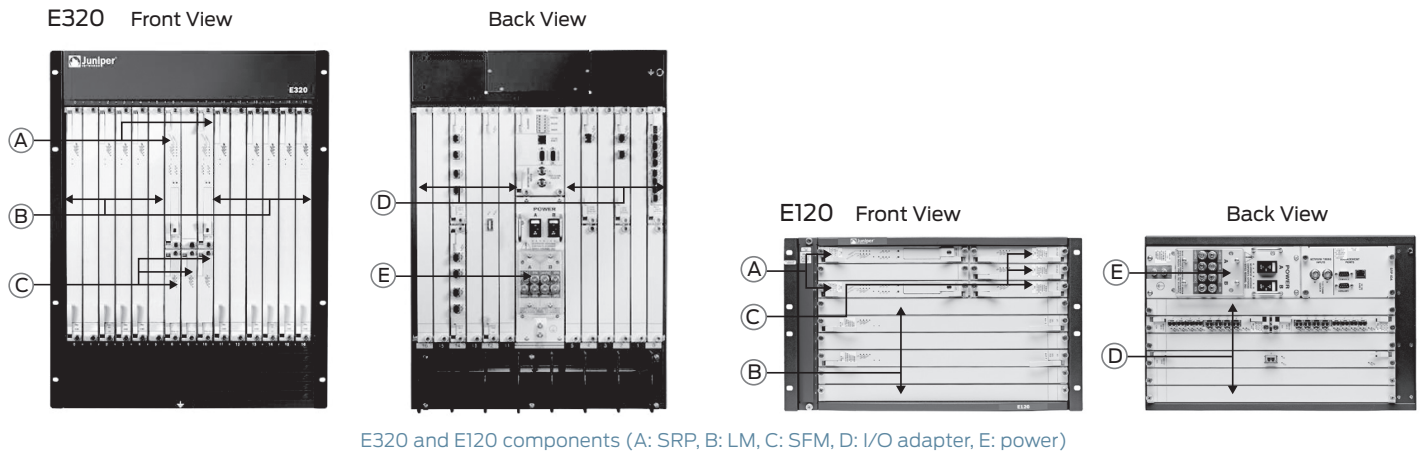
The E120, with its 120 Gbps switch fabric, is a high-performance routing platform optimized for multiplay service delivery in smaller POPs and even central offices.

The E320 and the E120 share many common components, and both support:

- Switch route processors (SRPs) that perform system management, routing table calculations maintenance, forwarding table computations, and other control plane functions.

- Switch fabric modules (SFMs) that create a distributed shared memory switching fabric.
- Line modules (LMs) that provide frame processing and forwarding for IOA modules.
- Power modules that distribute redundant power feeds to all components installed in the router through the system to all components.
- I/O Adapter (IOA) modules that flexibly provide the physical network connection via 10-Gigabit Ethernet, Gigabit Ethernet, Asynchronous Transfer Mode (ATM), and Packet over SONET (POS) interfaces.

The use of common components across both systems improves the operational environment by providing complete feature consistency and enabling a common sparing and management schema that helps lower total cost of ownership (TCO). The placement of these system components are as shown.



E320 and E120 Applications - With industry leading scale and flexibility, the Juniper Networks BSR portfolio underpins video, voice, and data service delivery, to both residential and business broadband customers.

Features and Benefits

The E320 and E120, together with JunosE OS, extend many economic and performance related benefits.

FEATURES	FEATURE DESCRIPTION	BENEFITS
Flexible high capacity	The E320 flexibly supports a 100 Gbps or a 320 Gbps switch fabric (40 Mpps - 180 Mpps performance).	Reduces operating and capital expenses by aggregating more subscribers and services.
Environmental efficiency	The E120 has a small form factor and reduced power budget for operation in smaller facilities.	Extends market reach: the E120 extends high performance to smaller POPs/COs without sacrificing features or reliability.
Carrier grade operating system	JunosE OS is production-hardened in the world's largest broadband networks.	Reduces operating expenses: increases reliable operation.
Operational consistency	The E320 and E120 share common components and JunosE OS.	Reduces operating expenses: ensures consistent network operations and simplifies sparing.
High Ethernet density	Both the E320 and E120 support high-density Gigabit Ethernet and 10-Gigabit Ethernet configurations.	Reduces operating and capital expenditures: flexibly permits both aggregation and "direct connect" models.
Line rate forwarding	Hardware-based forwarding plane, with separate dedicated processors for control plane and forwarding plane tasks.	Improves performance: ensures high performance for multiplay services, even at peak traffic conditions and with multiple services concurrently enabled at carrier scale.
Sophisticated QoS	Features include hierarchical queuing and scheduling, as well as rate-limiting for individual queues, subscribers, and both logical and physical interfaces.	Assures quality of experience: supports quality multiplay services to both residential and business consumers.
High availability	All major hardware subsystems and common equipment supports redundant configuration, while JunosE OS is a carrier-grade, field proven OS. (Unified ISSU, Stateful Control Plane Switchover)	Improves customer satisfaction: the combination of dependable hardware and reliable software delivers "always-on" services.
Access layer agnostic	Connects all types of xDSL, FTTx, and wireless broadband access networks to the IP/MPLS network.	Supports a broad set of business and residential applications, services, topologies and technologies.
Enables network, and service evolution	Concurrent support for: <ul style="list-style-type: none"> • ATM and Ethernet-based interfaces • IPv4 and IPv6 protocol implementations • Wireline and wireless Services DHCP, PPPoE and PPPoA • Basic Internet access and complex multiplay service bundles 	Provides a long service lifecycle with investment protection and operational consistency while flexibly and efficiently supporting technology migration and service transformation.
Integrated with Juniper Networks SRC Series Session and Resource Control Modules	Provides policy-based management of the network infrastructure.	Reduces operating and capital expenditures: intelligently automates network utilization.
E320/E120 component sharing	Line modules, IOAs, SRPs, SFMs, PDUs interchangeable between the E120 and E320.	Streamlines sparing requirements and lowers cost of ownership.



E320 BROADBAND SERVICES ROUTER



E120 BROADBAND SERVICES ROUTER

Specifications

For a complete list of E320 and E120 specifications and certifications, please consult the E Series technical documentation at www.juniper.net/techpubs/hardware/e-series.html.

		E120	E320
Dimensions and Power			
Weight	Chassis only	51 lb (23.18 kg)	88 lb (39.9 kg)
	Fully configured	107 lb (48.63 kg)	~215 lb (97.5 kg)
Dimensions (W x H x D)	Chassis only	17.45 x 11.25 x 25 in (44.32 x 28.58 x 63.5 cm)	19 x 24.5 x 25 in (48.26 x 62.23 x 63.5 cm)
	Chassis with cable management bracket and bezels	17.45 x 11.25 x 28 in (44.32 x 28.58 x 71.12 cm)	19 x 24.5 x 28 in (48.26 x 62.23 x 71.12 cm)
Environmental requirements	Network Equipment Building System (NEBS) GR-63-CORE compliant		
Ambient operating temperature	Long-term: -41° to 104° F (5° to 40° C) Short-term: 23° to 122° F (-5° to 50° C)		
Ambient operating humidity	Long-term: 5% to 85% (noncondensing) Short-term: 5% to 95% (noncondensing)		
Power input	Voltage: -40 to -72 VDC Current: 40 A @ -48 VDC		Voltage: -40 to -72 VDC Current: 80 A @ -48 VDC
Power consumption	Typical*: E120: 1638 W		Typical*: E320 (100 Gbps): 3241 W E320 (320 Gbps): 3347 W

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

Certifications

NEBS Certification

- SR-3580 (FD-15): NEBS Criteria Levels, Issue 1, November 1995
- GR-63 (LSSGR, FD-15): NEBS Requirements: Physical Protection, Issue 1, October 1995
- GR-1089 (LSSGR, FD-15): Electromagnetic Compatibility and Electrical Safety—Generic Criteria for Network Telecommunications Equipment, Issue 2, Rev1, 2/99

Safety Agency Certification, Information Technology Equipment

- AS/NZS 3260: 1993, Safety of Information Technology Equipment Including Electrical Business Equipment
- CAN/CSA C22.2, No. 60950-00, 3rd Edition, Safety of IT Equipment
- EN60825-1, Safety of Laser Products—Part 1: Equipment Class, Requirements, and User's Guide (2001)
- EN60950:2000, 3rd Edition, Safety of Information Technology Equipment
- IEC 60950-1(2001-10) Ed. 1.0 IT Equipment Safety Part 1: General Requirements
- Low Voltage Directive (73/23/EEC)

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, and C
- ETSI 300-386, Telecommunication Network Equipment, EMC requirements
- FCC Part 15 Class A
- IECS-003 Issue 3 Class A
- VCCI (Voluntary Control Council for Interference by Information Technology Equipment) Telecommunications Certification
- ACA TS 016-1997
- CTR13 Commission Decision of 9/9/97 on a common technical regulation for attachment requirements for terminal equipment interface for connection to 2048 kbit/s digital structured ONP leased lines: 97/521/EC – OJ No. L215 Vol. 40, 10/97
- CTR24 – Commission Decision of 9 September 1997 on a common technical regulation for attachment requirements for terminal equipment interface for connection to 34Mbit/s digital unstructured and structured leased lines: 97/639/EC – OJ No. L271 Vol. 40, 3 October 1997
- FCC PART 68
- IECS-003 Issue 3 Class A
- PD7024 – Essential requirements for terminal equipment intended for connection to unstructured digital leased circuits of the public telecommunications network using a CCITT recommendation G.703 interface at a rate of 2048 kbit/s with a 75 ohm unbalanced presentation, 1994
- RTTE Directive (1999/5/EEC)

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

For ordering information, please use the following Juniper Networks Sales contacts:

- North America/Latin America: 866.298.6428
- Asia/Pacific region: 852.2332.3636
- Europe, Middle East and Africa: 44.1372.385500
- To contact a J-Partner Reseller, see www.juniper.net/partners/find_partner.html or call 1.866.298.6428 and select Option 2

Product Options

Switch Fabric Options

FEATURE	E120 OPTIONS	E320 OPTIONS
Switch fabric capacity	120 Gbps	100 Gbps or 320 Gbps
Switch fabric modules	SFM-120 SFM-320*	SFM-100 SFM-320
Switch route processor modules	SRP-120 SRP-320*	SRP-100 SRP-320

* The E120 supports a maximum of 120 Gbps capacity per system, independent of the SFM and SRP used.

Line Module Options

LINE MODULE	PART NUMBER	DESCRIPTION
4 Gbps Line Module	ES2-4GS1-MOD	4 Gbps processing capacity for all I/O adapter IOAs
10 Gbps Line Modules	ES2-10GUPS2-MOD ES2-10GACS3-MOD ES2-10GACS4-MOD	• 10 Gbps processing for 10-Gigabit Ethernet I/O adapter only • 10 Gbps processing for Gigabit Ethernet and 10-Gigabit Ethernet I/O adapters • 10 Gbps advanced access line module for Gigabit Ethernet and 10 Gigabit Ethernet I/O adapters only
E320 and E120 Service Module	ES2-SERV51-IOA	Supports highly scalable IP tunnels (GRE, DVMRP/IP-in-IP), IP reassembly, and L2TP tunnel termination (LNS)

IOA Modules Options and System

Density

TECHNOLOGY	PART NUMBER	DESCRIPTION	MAX PORTS, E120	MAX PORTS, E320
10-Gigabit Ethernet	ES2-S1 10GE IOA	1x10-Gigabit Ethernet	6	12
Gigabit Ethernet	ES2-S1 GE-4 IOA	4x Gigabit Ethernet	24	48
	ES2-S1 GE-8 IOA	8x Gigabit Ethernet 20x Gigabit Ethernet	96	192
	ES2-GE20S3-IOA		120	240
OC3/STM1	ES2-S1 OC3-8/STM1 IOA	8xOC3/STM1 (ATM only)	96	192
OC12/STM4	ES2-S1 OC12-2/STM4 IOA	2xOC12/STM4 (ATM/POS)	24	48
OC48/STM16	ES2-S1 OC48-2/STM16 IOA	1xOC48/STM16 (POS)	6	12

System and Module Options

MODEL NUMBER	DESCRIPTION
--------------	-------------

E320 and E120 Base System Options

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

ES2-10GACS4-MOD	10 Gbps advanced access line module (Advanced LM10A) for E320 only
ES2-10GACS3-MOD	10 Gbps access line module (LM10A)
ES2-10GUPS2-MOD	10 Gbps uplink line module (LM10U)
ES2-4GS1-MOD	4 Gbps line module (LM4)

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
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

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 and Sales Headquarters

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

APAC Headquarters

Juniper Networks (Hong Kong)
26/F, Cityplaza One
1111 King's Road
Taikoo Shing, Hong Kong
Phone: 852.2332.3636
Fax: 852.2574.7803

EMEA Headquarters

Juniper Networks Ireland
Airside Business Park
Swords, County Dublin, Ireland
Phone: 35.31.8903.600
EMEA Sales: 00800.4586.4737
Fax: 35.31.8903.601

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

Copyright 2009 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, Junos, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, 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.