JUNIPER NETWORKS

JunosE™ Software for E Series™ Broadband Services Routers

Release Notes

Release
12.0.1

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JunosE™ Software for E Series™ Broadband Services Routers Release Notes, Release 12.0.1

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Release 12.0.1

Release Installation

Complete procedures for installing the system software are available in *JunosE System Basics Configuration Guide, Chapter 3, Installing JunosE Software*.

New software releases are available for download from the Juniper Networks website at http://www.juniper.net/customers/support. You can use the downloaded image bundle to create your own software CDs.

Before upgrading to a new version of software, save your router's running configuration to a .cnf file or .scr file. If you subsequently need to downgrade for any reason, you can restore the earlier software version.

Informational Note: When you upgrade the software on a router that has a large number of interfaces configured, the router might appear to be unresponsive for several minutes. This condition is normal; allow the process to continue uninterrupted.

Upgrading to Release 5.3.0 or a Higher-Numbered Release

When you upgrade from a lower-numbered release to Release 5.3.0 or a higher-numbered release, the higher release might not load if you issue the **boot system** command from Boot mode while the lower-numbered software is running on the router or if you insert a flash card running a higher-numbered release into a system running a lower numbered release. However, if you issue the **boot system** command from Global Configuration mode, the new software loads properly.

Upgrading from Release 5.1.1 or Lower-Numbered Releases to Release 6.x.x or Higher-Numbered Releases

Release 5.1.1 or lower-numbered releases support application images only up to 172 MB. Your software upgrades or application images may be available remotely through Telnet or FTP, or may be delivered on a new NVS card. If you upgrade the JunosE Software using a new NVS card, we recommend you perform the upgrade in two stages: first to an intermediate release and then to the higher-numbered release you want to run. This restriction is not applicable if you upgrade your software remotely through Telnet or FTP.

To install larger application images for Release 6.0.0 and higher-numbered releases, you must first install Release 5.1.2 (or a higher-numbered 5.x.x release). This enables the system to support application images greater than 172 MB. For example, if you are upgrading the software using a new NVS card, you cannot go from Release 5.1.1 to Release 7.2.0 without first upgrading to Release 5.1.2.

See the following table for compatibility of releases.

JunosE Release	Highest Release Able to Load	Cannot Load	Maximum Application Image
5.1.1 or lower-numbered release	5.3.5p0-2 or the highest-numbered 5.x.x release	6.x.x or higher-numbered release	172 MB (approximate)
5.1.2 or higher-numbered release	No limitation	Not applicable	234 MB (approximate)
7.2.0 or higher-numbered release	No limitation	Not applicable	256 MB (approximate)

For more detailed information on installing software, and about NVS cards and SRP modules, see the following documents:

- *JunosE System Basics Configuration Guide, Chapter 6, Managing Modules*
- *Upgrading NVS Cards on SRP Modules in ERX Hardware Guide, Chapter 8, Maintaining ERX Routers*
- *Upgrading NVS Cards on SRP Modules in E120 and E320 Hardware Guide, Chapter 8, Maintaining the Router*

Moving Line Modules Between Releases

The Juniper Networks ERX1440 Broadband Services Router employs a 40-Gbps SRP module and a new midplane. Release 3.3.2 was the first software release to support the 40-Gbps SRP module and midplane. Before you can transfer a compatible line module from a Juniper Networks ERX705, ERX710, or ERX1410 Broadband Services Router to an ERX1440 router, you must first load Release 3.3.2 or a higher release onto the current router, and then reboot the router to load the release onto the line modules. If you then move any of those line modules to an ERX1440 router, that router is able to recognize the line module.

If you move a compatible line module from an ERX1440 router to an ERX705, ERX710, or ERX1410 router, the module loads properly in the new router regardless of the release.

SRP Module Memory Requirements

For Release 5.3.0 and higher-numbered software releases on ERX14xx models, ERX7xx models, and the Juniper Networks ERX310 Broadband Services Router, see *ERX Module Guide, Table 1, ERX Module Combinations*, for detailed information about memory requirements.

For Release 8.2.0 and higher-numbered software releases on Juniper Networks E120 and E320 Broadband Services Routers, see *E120 and E320 Module Guide, Table 1, Modules and IOAs*, for detailed information about memory requirements.

Hardware and Software Compatibility

For important information about hardware and software, see the document set as follows:

- Combinations of line modules to achieve line rate performance are in *JunosE System Basics Configuration Guide, Chapter 6, Managing Modules*.
- Compatibility of *ERX router modules with software releases is in ERX Module Guide, Table 1, ERX Module Combinations*.
- Layer 2 and layer 3 protocols and applications supported by *ERX router modules are in ERX Module Guide, Appendix A, Module Protocol Support*.
- Compatibility of E120 router and E320 router modules with software releases is in *E120 and E320 Module Guide, Table 1, Modules and IOAs*.
- Layer 2 and layer 3 protocols and applications supported by IOAs on the E120 router and the E320 router are in *E120 and E320 Module Guide, Appendix A, IOA Protocol Support*.

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC Policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at http://www.juniper.net/customers/support/downloads/710059.pdf
- Product Warranties—For product warranty information, visit http://www.juniper.net/support/warranty/
- JTAC Hours of Operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/

- Join and participate in the Juniper Networks Community Forum:
  http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Manager:
  http://www.juniper.net/cm/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool located at
https://tools.juniper.net/SerialNumberEntitlementSearch/

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Manager tool in the CSC at
  http://www.juniper.net/cm/
- Call 1-888-314-JTAC
  (1-888-314-5822 – toll free in the USA, Canada, and Mexico)

For international or direct-dial options in countries without toll-free numbers, visit
http://www.juniper.net/support/requesting-support.html

Release Overview

These *Release Notes* cover Release 12.0.1 of the system software for the Juniper Networks E Series Broadband Services Routers and contain the following sections:

If the information in these *Release Notes* differs from the information found in the published documentation set, follow these *Release Notes*.

Before You Start

These *Release Notes* include information about the changes between Releases 12.0.0 and 12.0.1. Before you use your new software, read these *Release Notes* in their entirety, especially the section *Known Problems and Limitations*. You need the following documentation to fully understand all the features available in Release 12.0.1:

- These 12.0.1 *Release Notes*, which describe changes between Release 12.0.0 and Release 12.0.1
- The 12.0.0 *Release Notes*, which describe features available in Release 12.0.0
- The 12.0.x documentation set, which provides detailed information about features available in Release 12.0.0

The 12.0.x documentation set consists of several manuals and is available only in electronic format. You can print your own documentation using the PDF and HTML formats available at the Juniper Networks Technical Documentation Web site at www.juniper.net/techpubs. Refer to the following table to help you decide which document to use.

Task	Document
Install the router	*ERX Hardware Guide* *E120 and E320 Hardware Guide*
Learn about modules	*ERX Module Guide* *E120 and E320 Module Guide* *E Series End-of-Life Module Guide*
Get up and running quickly	*E Series Installation Quick Start poster or ERX Quick Start Guide* *E120 and E320 Quick Start Guide*
Configure the router	*JunosE System Basics Configuration Guide*
Configure physical layer interfaces	*JunosE Physical Layer Configuration Guide*

Task	Document
Configure link layer interfaces	*JunosE Link Layer Configuration Guide*
Configure line module redundancy, stateful SRP switchover, unified ISSU, VRRP, and interchassis redundancy (ICR)	*JunosE Service Availability Configuration Guide*
Configure IP, IPv6 and Neighbor Discovery, and interior gateway protocols (RIP, OSPF, and IS-IS)	*JunosE IP, IPv6, and IGP Configuration Guide*
Configure IP routing services, including routing policies, NAT, J-Flow statistics, BFD, IPSec, digital certificates, and IP tunnels	*JunosE IP Services Configuration Guide*
Configure IP multicast routing and IPv6 multicast routing	*JunosE Multicast Routing Configuration Guide*
Configure BGP, MPLS, Layer 2 service, and related applications	*JunosE BGP and MPLS Configuration Guide*
Configure policy management	*JunosE Policy Management Configuration Guide*
Configure quality of service (QoS)	*JunosE Quality of Service Configuration Guide*
Configure remote access	*JunosE Broadband Access Configuration Guide*
Get specific information about commands	*JunosE Command Reference Guide A to M* *JunosE Command Reference Guide N to Z*
Monitor system events	*JunosE System Event Logging Reference Guide*
Look up definitions of terms used in JunosE technical documentation	*JunosE Glossary*

Release Highlights

Release 12.0.1 is a maintenance release and includes the features described in this section.

Category	Feature
IPv6	• *IPv6 Support for Frame Relay and Multilink Frame Relay Interfaces* on page 6
SNMP	• *System MIB Support for Display of Maximum Fan Speed State* on page 7

IPv6

- IPv6 Support for Frame Relay and Multilink Frame Relay Interfaces

  You can now configure IPv6 prefix addresses on Frame Relay interfaces on a packet over SONET (POS) physical interface. IPv6 traffic is forwarded over Frame Relay circuits and the database of the forwarding controller is updated with IPv6 as an upper-layer interface to the Frame Relay layer.

  You can use the **ipv6 address** command in Subinterface Configuration mode to add an IPv6 address to a Frame Relay PVC over a POS subinterface. You can also use the **ipv6 address** command in Interface Configuration mode to add an IPv6 address on an interface with Frame Relay as the encapsulation method that operates as data communications equipment (DCE), data terminal equipment (DTE), or network-to-network interface (NNI).

For MLFR interfaces, you can configure IPv6 addresses on Frame Relay subinterfaces in an MLFR bundle that contains serial interfaces as member links. You can use the **ipv6 address** command in Subinterface Configuration mode to add an IPv6 prefix to a Frame Relay subinterface in an MLFR bundle that contains serial member links.

Change in existing behavior: Existing feature extended as described here. In lower-numbered releases, an error message was displayed when you attempted to configure IPv6 addresses on Frame Relay and MLFR interfaces and the setting was not saved.

SNMP

- System MIB Support for Display of Maximum Fan Speed State

  Support has been added to the Juniper Networks System MIB to enable you to display the maximum fan speed state for the line module or IOA installed in a specific slot in the router. The juniSystemTempStatus object, which denotes the temperature status of a system, has been modified in the Juniper Networks System MIB to include a new attribute for the temperature sensor state to display the maximum fan speed state. A new temperature state, maxFanSpeed, has been added to reflect the state of fans running at their maximum speed state.

  Change in existing behavior: Existing feature extended as described here.

Early Field Trial Features

The features described in this section are present in the code but have not yet been fully qualified by Juniper Networks. These features are available only for field test purposes in this release. If you use any of these features before they have been fully qualified, it is your responsibility to ensure that the feature operates correctly in your targeted configuration.

DHCP

- Support for DHCP External Server, DHCP Local Server, DHCP Relay, and DHCP Relay Proxy on POS Access Interfaces

  The following packet over SONET (POS) module combinations on E Series routers now support configuration of the DHCP external server, DHCP local server, DHCP relay, and DHCP relay proxy applications, alone or in combination, when the POS module is the access interface:

  - POS module combinations on the E120 router and the E320 router:
    - ES2 4G LM with ES2-S1 OC12-2 STM4 POS IOA
    - ES2 4G LM with ES2-S1 OC48 STM16 POS IOA
  - POS module combinations on ERX14xx models, ERX7xx models, and the ERX310 router:
    - OCx/STMx POS line module with OC3-4 I/O module
    - OCx/STMx POS line modules with OC12/STM4 I/O module
    - OC48 line module with OC48 FRAME APS I/O module

  In the current release, this feature is available for early field test purposes only.

You can configure DHCP external server, DHCP local server, DHCP relay, and DHCP relay proxy on these POS modules in either a virtual router (VR) or a VPN routing and forwarding instance (VRF).

As part of this feature, the **pos** keyword has been added to the existing **ip dhcp-local limit** command. To specify the maximum number of IP addresses that the DHCP local server application can supply to all POS access interfaces or to a specific POS access interface, in the range 0–96000, use the **ip dhcp-local limit** command with the new **pos** keyword. For example:

```
! Set the IP address limit for all POS access interfaces to 1000
host1(config)#ip dhcp-local limit pos 1000
! Set the IP address limit for the specified POS access interface to 2000
host1(config)#ip dhcp-local limit interface pos 5/0/0 2000
! Restore the IP address limit for all POS access interfaces to the default value, ! 48000
host1(config)#no ip dhcp-local limit pos
```

To display the maximum number of IP address leases available for POS access interfaces, use the existing **show ip dhcp-local limits** command. For example:

```
host1#show ip dhcp-local limits

****************************************
     DHCP Local Server Address Limits
ATM Limit      - 48000
VLAN Limit     - 48000
POS Limit      - 1000
Ethernet Limit - 48000
```

IS-IS

- Support for Ignoring the Attach Bit in Level 1 LSPs

  You can configure IS-IS to disregard the Attach Bit (ATT) in level 1 LSPs in a multiarea environment. In level 1 routing, the closest level 1-2 router determines the default routes within IS-IS routing domains. The attach bit in the level 1 LSP determines the closest level 1-2 router. The ability to disregard the attach bit enables IS-IS to prevent default routes from being installed.

  You can use the **ignore-attached-bit** command to disregard the attach bit in level 1 LSPs. For example:

  ```
  host1(config-router)# ignore-attached-bit
  ```

  The following command has been added in this release:

  - **ignore-attached-bit**

  This feature is limited in this release to early field trial purposes only.

- Ability to Advertise IP Prefixes of Passive Interfaces

  You can configure IS-IS to advertise IP prefixes that belong to only passive interfaces. Enabling this feature causes only connected passive IP prefixes to be retained and all other entries ro be removed from the LSP database. Disabling this command restores all the entries in the LSP database, thus allowing all IP prefixes to be advertised.

You can use the **advertise-passive-only** command to advertise IP prefixes of passive interfaces only. For example:

host1(config-router)# **advertise-passive-only**

Configuring IS-IS to advertise only passive interfaces reduces network convergence time between two integrated IS-IS systems.

The following command has been added in this release:

- **advertise-passive-only**

This feature is limited in this release to early field trial purposes only.

Stateful Line Module Switchover (High Availability)

- Support for Stateful Line Module Switchover on ES2 4G LMs with ES2-ES1 Service IOA on E120 and E320 Routers

  JunosE Software now supports high availability for ES2 4G line modules configured with Service IOAs on E120 and E320 routers. These line modules function in a 1:1 redundancy mode with the active module as the primary line module and the spare or standby module as the secondary line module. This functionality of high availability for line modules is also referred to as *stateful line module switchover*.

  Stateful line module switchover reduces the impact on subscriber traffic during a stateful switchover from the active line module to the standby line module by ensuring that existing subscriber sessions remain active with a brief disconnection in traffic. Stateful line module switchover maintains user sessions and reduces data forwarding outage to a brief duration through the router during the switchover, thereby improving the overall availability of the router.

  The following commands have been added or modified to support configuration and monitoring of stateful line module switchover:

  - **line-card switch**
  - **mode high-availability slot**
  - **show redundancy history line-card**
  - **show redundancy line-card**

  As part of this feature, the following SNMP MIB objects have been added to the Juniper Networks Redundancy MIB to support the stateful line module switchover functionality:

  - juniLcRedundancyActiveSlot
  - juniLcCardRedundancyStandbySlot
  - juniLcRedundancyLastResetReason
  - juniLcRedundancyActivationType
  - juniLcRedundancyHaActiveTime
  - juniLcRedundancySwitchoverTime

  In addition, the ha event log category has been modified to record information when the system transitions from one high availability state to another, when a stateful line module switchover is performed.

  This feature is limited in this release to early field trial purposes only.

Unsupported Features

The JunosE Release 12.0.x documentation set describes some features that are present in the code but that have not yet been fully qualified by Juniper Networks. If you use any of these features before they have been fully qualified, it is your responsibility to ensure that the feature operates correctly in your targeted configuration.

The following features are present but unsupported in this release.

E120 Router and E320 Router

- The ES2 10G LM and ES2 10G Uplink LM do not support layer 2 statistics for VLANs.
- Subscriber Interfaces on the ES2 10G Uplink LM

  You can configure dynamic subscriber interfaces and static subscriber interfaces on the ES2 10G Uplink LM using the CLI. However, configuring subscriber interfaces on the ES2 10G Uplink LM provides no benefit because access features such as per-subscriber QoS are unavailable on the module.

Policy Management

- External Parent Groups Unsupported on ES2 10G, ES2 10G Uplink, and ES2 10G ADV LMs

  External parent groups are not supported on the ES2 10G, ES2 10G Uplink, and ES2 10G ADV LMs. If you create a policy that references an external parent group on these LMs, the system prevents you from attaching it to the LM interface and you receive an error message.

Stateful SRP Switchover (High Availability)

- Stateful SRP Switchover for Certain Applications

  The stateful SRP switchover feature has not been qualified for the following applications:

Remote Access
– DHCP proxy client
– L2TP dialout

Release Software Protocols

The following list identifies the major software protocols supported in this release. For detailed information about any protocol, see the configuration guides.

Core Routing Stack

- Internet Protocol (IP) version 4 and version 6
- Transmission Control Protocol (TCP) for IPv4
- User Datagram Protocol (UDP) for IPv4 and IPv6

Layer 2 Protocols

- Asynchronous Transfer Mode (ATM)
- Bridged Ethernet
- Bridged IP
- Cisco High-Level Data Link Control (Cisco HDLC)

- Ethernet
- Extensible Authentication Protocol (EAP)
- Frame Relay
- Layer 2 Tunneling Protocol (L2TP)
- Multilink Frame Relay (MLFR)
- Multilink Point-to-Point Protocol (MLPPP)
- Packet over SONET (POS)
- Point-to-Point Protocol (PPP)
- PPP over Ethernet (PPPoE)
- Transparent bridging

Multiprotocol Label Switching (MPLS)

- Border Gateway Protocol (BGP-4)
- Label Distribution Protocol (LDP)
- Resource ReSerVation Protocol – Traffic Engineering Extensions (RSVP-TE)

Network Management Protocols

- Simple Network Management Protocol (SNMP) versions 1, 2c, and 3

Routing Protocols

- Border Gateway Protocol (BGP-4)
- Distance Vector Multicast Routing Protocol (DVMRP)
- Internet Group Membership Protocol (IGMP)
- Intermediate System–to–Intermediate System (IS-IS)
- Layer 2 Virtual Private Networks (L2VPNs)
- Mobile IP
- Open Shortest Path First (OSPF) version 2 and version 3
- Protocol Independent Multicast Protocol (PIM), including PIM dense mode, PIM sparse mode, PIM dense-sparse mode, and PIM source-specific multicast
- Routing Information Protocol (RIP) version 2
- Virtual Private LAN Service (VPLS)
- Virtual Router Redundancy Protocol (VRRP)

Security Protocols

- Internet Key Exchange (IKE)
- Internet Security Association and Key Management Protocol (ISAKMP)
- IP Authentication Header (AH)
- IP Encapsulating Security Payload (ESP)
- Network Address Translation (NAT)

SRC Software and SDX Software Compatibility Matrix

The SRC software offers the features of the SDX software on the C Series Controllers, a range of hardware platforms that use the Linux operating system. In contrast, the SDX software runs on Solaris workstations. The SRC software contains the features found in the associated SDX release plus additional features described in the *SRC Release Notes*.

The following table shows which versions of the SRC software and SDX software are compatible with specified versions of the JunosE Software.

SRC Software Release	SDX Software Release	Tested with JunosE Release
2.0.0	7.1.0	8.1.2, 8.2.2
2.1.0	Not applicable	9.1.0p0-1
3.0.0	Not applicable	9.0.0, 9.0.1, 9.1.1
3.1.0	Not applicable	9.2.0, 9.3.0, 10.0.0
3.2.0	Not applicable	10.1.0, 10.2.0, 10.3.0
4.0.0	Not applicable	10.3, 11.0, 11.1

For more detailed information about SRC software and SDX software compatibility with JunosE releases, see the *SRC Release Notes*.

Known Behavior

This section briefly describes E Series router behavior and related issues. In some cases the behavior differs from non–E Series implementations; in others the behavior is included to emphasize how the router works.

AAA

- Although you can use the **max-sessions** command to configure a maximum of 32,000 outstanding authentication/authorization requests to a RADIUS server, AAA internal limits prevent the actual number of outstanding authentication/authorization requests from exceeding 9600. These internal AAA limits apply only to authentication/authorization requests and not to accounting requests.
- The JunosE Software does not support accounting for ATM 1483 subscribers. The **atm1483** keyword for the **aaa accounting default** command is present in the CLI, but it is not supported.

ATM

- You cannot configure connection admission control (CAC) on an ATM interface on which you have created a bulk-configured virtual circuit (VC) range for use by a dynamic ATM 1483 subinterface. Conversely, you cannot create a bulk-configured VC range on an ATM interface on which you have configured CAC. The router rejects these configurations, which causes them to fail.

  Configuring CAC and bulk-configured VCs on the same ATM interface was supported in previous JunosE Software releases. As a result, If you are upgrading to the current JunosE release from a lower-numbered release, configurations that use CAC and bulk configuration on the same ATM interface continue to work. However, we recommend that you disable CAC on these ATM interfaces to ensure continued compatibility with future JunosE releases.

- When you reload an ATM line module that is configured with NBMA circuits as passive OSPF interfaces and that has established OSPF adjacencies and IBGP peers (configured on Gigabit Ethernet interfaces), the transmission of OSPF hello packets might be affected until all the NBMA interfaces have initialized.

  Work-around: Either remove the passive OSPF interface statements on the NBMA interfaces, or statically configure the OSPF cost on the NBMA interfaces.

- When you configure an ATM PVC where PCR = SCR and maximum burst size is zero, the CLI returns an error indicating the burst size is invalid and it does not create the VC.

  Work-around: Configure a CBR or a UBR plus PCR to create the circuit with the same parameters, depending on the desired priority for the traffic. CBR has a high priority and UBR plus PCR has a medium priority.

- The ATM peak cell rate (PCR) does not appear in the L2TP Calling Number AVP for the first PPP session when the ATM shaping parameters were configured by RADIUS return attributes.

- When you use the **no-authenticate** keyword with the **subscriber** command to prevent subscriber authentication so that the subscriber information can be used for DHCP option 82, suboption 2, the SRP module can reset. This issue does not occur when you use the **no-authenticate** keyword with the **subscriber** command as a way to perform a RADIUS configuration.

- When you perform an snmpWalk on the juniAtmSubIfVccTable, a response is received for only a few of the total configured ATM subinterfaces when both of the following are true: the router has a line module that has some ATM-related configuration and the line module is in the disabled state.

BGP

- The E Series router does not include the link-local IPv6 address in the next-hop field of an MP-BGP update message carrying IPv6 routing information over IPv4 transport. This behavior is compliant with RFC 2545 but might have interoperability issues with other implementations that depend on a link-local IPv6 address in the next-hop field on a directly connected external BGP peering.

  Work-around: Enable EBGP multihop configuration on the remote (non–Juniper Networks) peer.

- The following message might be displayed under certain conditions:

  bgpConnections (default,0.0.0.0): TCP error code xx (...) occurred while accepting inbound TCP connection

  The message is generated when an unconfigured peer attempts to establish a TCP session with an E Series router and a valid route to the source address of the peer is absent from the router's routing table.

  If a valid route exists in the routing table, the following message is displayed when an unconfigured peer attempts to establish a TCP session with an E Series router; X.X.X.X is the source address of the unconfigured peer:

  NOTICE 08/29/2001 16:50:11 bgpConnections (default,X.X.X.X): Inbound connection refused - no peer X.X.X.X configured in core

BGP/MPLS VPNs

- In a scaled environment, we recommend that you increase the hold timers for the following protocols to appropriate values, based on the level of complexity of the network and scaling settings, so as to enable graceful restart to be completed successfully. [Defect ID 184974]
  - BGP
  - IS-IS
  - LDP
  - OSPF
  - RSVP

  For a sample configuration scenario that illustrates how to configure hold timers for successful graceful restart in a scaled environment, see *JunosE BGP and MPLS Configuration Guide, Chapter 1, Configuring BGP Routing.*
- NAT does not function properly with secondary routing table lookup (fallback global) or global export mapping on the VRF.

B-RAS

- Pool groups are not supported; although the **ip local pool group** command appears in the CLI, it is not supported.
- If the router is under a heavy load, the **show profile** command might take longer than usual to execute.

  Work-around: You can either delay examination of profiles until the router is less busy, or save a copy of the profile to a text file off the router.

Bridged Ethernet

- The CLI erroneously permits you to configure bridge1483 encapsulation over AAL5MUX IP even though that configuration is not supported.

CLI

- In Interface Configuration mode for a major interface, the CLI displays options for protocols that are not supported by that interface type.
- When you issue the **reload** command on an ERX310 router, the command might display a warning message that erroneously indicates that a synchronizing operation will be performed. Any references to synchronization that appear in command output or system messages do not apply to the ERX310 router, which does not support SRP module redundancy.
- The following commands have been deprecated in the JunosE Software and might be removed completely in a future release. If a command has been deprecated for only a particular command mode, the table specifies any modes for which it is still available.

Deprecated Command	Command Mode	Preferred Command
aaa accounting interval	Global Configuration	aaa service accounting interval and aaa user accounting interval
cablelength short	Controller Configuration	
clock rate	Interface Configuration	
channel-group description	Controller Configuration	

Deprecated Command	Command Mode	Preferred Command
channel-group shutdown	Controller Configuration	
channel-group snmp trap link-status	Controller Configuration	
channel-group timeslots	Controller Configuration	
classifier-list	Global Configuration	ip classifier-list
color	Policy List Configuration	color in Classifier Group Configuration mode
controller e1	Global Configuration	
controller t1	Global Configuration	
description	Interface Configuration Still available in Controller Configuration and VRF Configuration modes	ip description
fdl	Controller Configuration	
fdl carrier	Controller Configuration	
fdl string	Controller Configuration	
fdl transmit	Controller Configuration	
filter	Policy List Configuration	filter in Classifier Group Configuration mode
forward next-hop	Policy List Configuration	forward next-hop in Classifier Group Configuration mode
forward next-interface	Policy List Configuration	forward interface in Classifier Group Configuration mode
hostname	Domain Map Tunnel Configuration Still available in Global Configuration mode	client-name
hssi description	Interface Configuration	
hssi force dte acknowledge	Interface Configuration	
hssi internal-clock	Interface Configuration	
ignore dcd	Interface Configuration	
ignore link-state-signals	Interface Configuration	
[no] ike crl	Global Configuration	[no] ipsec crl
interface hssi	Global Configuration	
invert tx clock	Global Configuration	
ip dhcp-local cable-modem	Global Configuration	set dhcp-relay with the strings docsis and pktc in the server-string mapping specification
ip mirror	Global Configuration	ip policy secure-input and ip policy secure-output; for E120 and E320 routers, you must use these commands because the ip mirror command has been removed from the CLI for those routers.
ip policy local-input	Interface Configuration, Profile Configuration	None
[no] ipsec isakmp-policy rule	Global Configuration	[no] ipsec ike-policy-rule

Deprecated Command	Command Mode	Preferred Command
ipv6 policy local-input	Interface Configuration, Profile Configuration	None
j1	Controller Configuration	
license l2tp-session	Global Configuration	None
lineCoding	Controller Configuration	
log	Policy List Configuration	log in Classifier Group Configuration mode
log severity debug dhcpLocalProtocolDecode	Global Configuration	log severity debug dhcpCapture
loopback	Domain Map Configuration Still available in Controller Configuration and Interface Configuration modes	local-interface
loopback remote { remote line fdl ansi | remote line fdl bellcore | remote line inband remote payload [fdl] [ansi] }	Controller Configuration	
mark	Policy List Configuration	mark in Classifier Group Configuration mode
mark-de	Policy List Configuration	mark-de in Classifier Group Configuration mode
mark-exp	Policy List Configuration	mark-exp in Classifier Group Configuration mode
mark-user-priority	Policy List Configuration	mark-user-priority in Classifier Group Configuration mode
mpls ldp discovery transport-address	Interface Configuration	This command has no effect in Interface Configuration mode. Now available in Global Configuration mode.
mpls topology-driven-lsp ip-interfaces	Global Configuration	ldp ip-forwarding
[no] next-hop	Policy List Configuration	forward next-hop in Classifier Group Configuration mode
[no] next-interface	Policy List Configuration	forward interface in Classifier Group Configuration mode
nrzi-encoding	Interface Configuration	
no ospf enable	Router Configuration	ospf shutdown
policy-list	Global Configuration	ip policy-list
radius disconnect client	Global Configuration The RADIUS Disconnect Configuration mode has been removed from the CLI.	subscriber disconnect
rate-limit-profile	Policy List Configuration	rate-limit-profile in Classifier Group Configuration mode
remote-loopback	Controller Configuration	
router-name	Domain Map Configuration Still available in Tunnel Group Tunnel Configuration mode	auth-router-name and ip-router-name in Domain Map Configuration mode
show controllers t1/e1	User Exec, Privileged Exec	
show controllers t1 remote	User Exec, Privileged Exec	
show ike certificates	User Exec, Privileged Exec	show ipsec certificates

Deprecated Command	Command Mode	Preferred Command
show ike configuration	User Exec, Privileged Exec	show ipsec ike-configuration
show ike identity	User Exec, Privileged Exec	show ipsec identity
show ike policy-rule	User Exec, Privileged Exec	show ipsec ike-policy-rule
show ike sa	User Exec, Privileged Exec	show ipsec ike-sa
show ip dhcp-external binding	Privileged Exec	show dhcp binding
show ip dhcp-external binding-id	Privileged Exec	show dhcp binding
show ip dhcp-local binding	Privileged Exec	show dhcp binding
show ip dynamic-interface-prefix	Privileged Exec, User Exec	None
show ip mirror interface	Privileged Exec	show secure policy-list
show license l2tp-session	User Exec, Privileged Exec	None
t1 lineCoding	Controller Configuration	None. This command never had any effect.
traffic-class	Policy List Configuration	traffic-class in Classifier Group Configuration mode
tunnel mpls label-dist	Interface Configuration, Tunnel Profile Configuration	None
tunnel mpls autoroute announce bgp	Interface Configuration, Tunnel Profile Configuration	None
unframed	Controller Configuration	
user-packet-class	Policy List Configuration	user-packet-class in Classifier Group Configuration mode
virtual-router	Domain Map Configuration Still available in Privileged Exec and Global Configuration modes	auth-router-name and ip-router-name in Domain Map Configuration mode
yellow	Controller Configuration	

The router displays a notice when you issue the command manually. If the command is in a script, the router automatically maps the deprecated command to the preferred command. If the deprecated command no longer has a function, then that command has no effect when you run a script containing the command.

- The **show configuration** command normally takes a long time to finish for extremely large configurations. If you specify a search string (with the **begin**, **exclude**, or **include** options) with the command for a string that is not present in the configuration, then the CLI session appears to be busy for a prolonged period. The CLI filtering feature for **show** commands does not speed up execution of the command.

DHCP

- Configuring authentication on the DHCP local server requires that you first disable the DHCP local server for standalone mode. Doing so removes your entire DHCP local server configuration. Therefore, if you want to configure authentication, do so before you have otherwise configured the DHCP local server.
- When you upgrade from a release numbered lower than Release 7.1.0, all DHCP host routes previously stored in NVS are deleted. After the upgrade, DHCP clients must reacquire their IP addresses, which results in the new host routes being correctly stored in NVS.

DHCP External Server

- When the DHCP relay agent application and the DHCP external server application are configured in the same virtual router, using the **ip dhcp-external server-sync** command on an unnumbered IP interface does not function as expected. When you issue the **ip dhcp-external server-sync** command in this configuration to create subscriber state information based on lease renewals when the external DHCP server and the router are unsynchronized, the router does not forward the ACK request from the DHCP server to the client because there is no route. [Defect ID 88562]
- When a bound DHCP client on a dynamic subscriber interface extends its IP address lease by restarting the DHCP discovery process on its primary IP interface instead of by initiating the DHCP renewal process on its dynamic subscriber interface, the default behavior of the DHCP external server application to preserve the client's dynamic subscriber interface was changed in the following JunosE releases to delete and re-create the client's dynamic subscriber interface:
  - Release 7.2.4p0-4 and all higher-numbered 7.2.x releases and patch releases
  - Release 7.3.4 and all higher-numbered 7.3.x releases and patch releases
  - Release 8.0.4 and all higher-numbered 8.0.x releases and patch releases
  - Release 8.1.2 and all higher-numbered 8.1.x releases and patch releases
  - Release 8.2.3 and all 8.2.3 patch releases
  - Release 9.0.0 and all 9.0.0 patch releases
  - Release 9.0.1 and all 9.0.1 patch releases
  - Release 9.1.0 and all 9.1.0 patch releases

  If you are upgrading the JunosE Software on the router from any of these releases, you must explicitly issue the **ip dhcp-external recreate-subscriber-interface** command to configure the router to continue to delete and re-create the DHCP client's dynamic subscriber interface.

Informational Note: The DHCP external server application is unsupported in JunosE Release 8.2.1 and JunosE Release 8.2.2.

- DHCP external server may not be able to bind all DHCP clients when all of the following conditions exist:
  - DHCP external server and either DHCP relay or relay proxy are configured in separate virtual routers on an E320 router.
  - The client-facing and server-facing interfaces for DHCP external server and either DHCP relay or relay proxy are configured on the same ES2 4G LM.
  - DHCP external server is configured to create dynamic subscriber interfaces.

  When these three conditions exist simultaneously, the ES2 4G LM may not be able to successfully process all DHCP packets. Although all clients may get bounded in DHCP relay or relay proxy, some clients may not get bounded in DHCP external server. (In a production environment it is highly unlikely for conditions 1 and 2 to exist because stand-alone DHCP external server is normally configured for a DHCP relay in a different chassis.)

Work-around: You can eliminate this issue by modifying any one of these conditions. For example, this issue does not exist with any of the following configuration modifications:

- Configure DHCP external server and either DHCP relay or relay proxy in the same virtual router.
- Configure the client-facing and server-facing interfaces for DHCP external server and either DHCP relay or relay proxy on the same ES2 10G LM instead of the same ES2 4G LM.
- Configure the client-facing and server-facing interfaces for DHCP external server and either DHCP relay or relay proxy on separate ES2 4G LMs.

- DHCP NAK packets are sent from a different VLAN than the one on which the renew request is received on a router that is configured with dynamic VLANs, DHCP local server, and automatically created dynamic subscriber interfaces. This behavior occurs only after a link flap has taken place.

Dynamic Interfaces

- Dynamic IPv6 interfaces over static PPP interfaces are not supported.

Ethernet

- The hashing algorithm that selects the LAG member link is associated with the IP address of the subscriber client to support QoS. Consequently, a particular flow is always hashed to the same link. When a member link is removed from a LAG bundle, traffic rate is disrupted and traffic flow is reduced. When the link goes down and then comes back up, the traffic flow is automatically redistributed.
- When counting bits per second on a Fast Ethernet or Gigabit Ethernet interface, an E Series router includes 12 bytes for interpacket gap, 7 bytes for preamble, and 1 byte for start frame delimiter, for a total of 20 bytes (160 bits) per packet more than some non–E Series routers. This value therefore shows the total bandwidth utilization on the interface, including both data and overhead.
- To bridge unicast known-DA packets at line rate on both 2-Gbps ports of the GE-2 line module or the GE-HDE module when paired with the GE-2 SFP I/O module, the minimum packet size must be at least 144 bytes.

  When installed in the ERX1440 router, the GE-2 module delivers full bandwidth of 4 GB per line module (2 GB at the ingress and 2 GB at the egress) only when installed in slot 2 or slot 4, and when the SRP-40G+ module is used in the router. When installed in any other ERX1440 slot, the GE-2 module delivers a maximum bandwidth of 2 GB per line module (1 GB maximum at the ingress and 1 GB maximum at the egress). Therefore, of the maximum 24 possible ports for the module in an ERX1440 chassis (that is, two ports in each of 12 slots), full bandwidth is delivered only on a maximum of four ports (those in slots 2 and 4).

  When installed in the ERX1440 router, the GE-HDE line module delivers full bandwidth of 4 GB per line module (2 GB at the ingress and 2 GB at the egress) only when installed in slot 2 or slot 4, and when the SRP-40G+ module is used in the router. When installed in any other ERX1440 slot, the GE-HDE module delivers a maximum bandwidth of 2 GB per line module (1 GB maximum at the ingress and 1 GB maximum at the egress). Therefore, of the maximum 96 possible ports for the module in an ERX1440 chassis (that is, 8 ports in each of 12 slots), full bandwidth is delivered only on a maximum of 16 ports (those in slots 2 and 4).

When the GE-2 line module or the GE-HDE line module is installed in either the ERX1440 router or the ERX310 router and both ports are active, line rate performance is achieved only with packets that are 174 bytes or larger. The line module might not achieve line rate with packets that are smaller than 174 bytes.

- Support for the 0x9200 S-VLAN Ethertype has been removed. You can no longer specify the **9200** option with the **svlan ethertype** command.

  When you upgrade to Release 7.1.0 or a higher-numbered release, the software automatically transfers existing configurations that use the 0x9200 Ethertype to the 0x88a8 Ethertype.

- The **show interface gigabitEthernet** command output does not display the following line of output for Gigabit Ethernet modules that do not support SFPs, such as the GE Single Mode I/O module and GE I/O Multi Mode I/O modules:

```
Primary/Secondary link signal detected
Primary/Secondary link signal not detected
```

Flash

- Flash cards manufactured by Wintec are present on some currently deployed routers. When you upgrade the JunosE Software on such routers, the firmware on the flash card controller is automatically updated during diagnostics. During this reboot, the software runs an integrity check on the file system to verify that the firmware update did not corrupt the contents of the flash card. This integrity check is an expected side effect of the enhanced firmware available in this release. The integrity check does not indicate a problem with the flash card or its contents.

Forwarding

- A memory leak of about two percent can occur on the ES2 10G LM and result in a module reset when a large number of successive SRP switchovers take place with active DHCP clients.
- VPLS forwarding does not function properly when any of the following conditions occur:
  - MLPPP interfaces are used
  - L2TP is used with sequence numbers enabled
  - GRE is used with sequence numbers enabled

GRE

- When you shut down the only outgoing IP interface to the IP destinations of GRE/IP tunnels, the tunnels remain in the up state rather than transitioning to down. As a consequence, all IP routes that use these tunnels as next hops also remain in the routing table.

Hardware

- SRP modules with only 1 GB of memory do not work reliably in ERX7xx and ERX14xx routers running JunosE Release 8.1.0 or higher, and may experience system resets due to an out of memory condition. However, the ERX310 router still supports 1 GB of memory in the SRP-SE10 module.

  Work-around: Upgrade your SRP module memory to 2 GB for all ERX7xx and ERX14xx routers running JunosE Release 8.1.0 or higher.

- Do not include a **not** *protocol* clause in any classifier control list for policies attached to an interface on an ES2 10G Uplink LM. The **not** *protocol* functionality is not available for this module.
- The ES2 10G LM and the ES2 10G Uplink LM do not support VLAN statistics in the current release.
- PCMCIA NVS Card Caution

Caution: Before you insert or remove PCMCIA NVS (flash) cards from a running router, we strongly recommend that you halt the SRP module or shut down the router. Failure to do this can result in file corruption in one or both cards.

- The 4XOC3 APS MULTIMODE and 4XOC3 APS SINGLE MODE I/O modules are incompatible with the following versions of the OCx/STMx ATM and OCx/STMx POS line modules:
  - OCx/STMx ATM line modules with assembly numbers 350-00039-xx, 350-80039-xx, and 350-90039-xx
  - OCx/STMx POS line modules with assembly number 350-10039-xx
- When you configure 1:5 line module redundancy by using either the 4XOC3 APS MULTIMODE or 4XOC3 APS SINGLE MODE I/O module, the spare R-Mid OCX I/O module you install must have assembly number 350-00094-01 Rev. A01 or later. Spare R-Mid OCX I/O modules with an earlier assembly number are not supported for 1:5 redundancy configurations that use either the 4XOC3 APS MULTIMODE or 4XOC3 APS SINGLE MODE I/O module.
- There is a very small chance that some line modules can have an improperly modified keying block that prevents the module from proper seating in the top slot of an older ERX7xx chassis or a preproduction ERX310 chassis. For example, this problem has been observed for an OCx/STMx module in slot 2 of an early-test ERX310 chassis.

  Work-around: Remove the keying block to insert the module into the top slot, or insert the module into a different slot.

HDLC

- By design, on the cOC12/STM4 module you cannot delete a serial interface while data for the interface is still enqueued. The enqueued data can drain only when the interface is operationally up. Therefore you must ensure that the interface is operationally up before you delete it. For example, if you have issued the **shutdown** command for the interface before you try to delete the interface, issue the **no shutdown** command, then delete the interface.

IP

- If you enable detection of duplicate IPv6 prefixes using the **aaa duplicate-prefix-check** command, and bring up a subscriber in a dual-stack network (in which both IPv4 and IPv6 subscribers are present) over a static PPP interface for which IPv6 prefix is configured for IPv6 Neighbor Discovery router advertisements (using the **ipv6 nd prefix-advertisement ipv6Prefix** command), the subscriber session is successfully brought up. When you attempt to bring up another subscriber over a different interface on the same virtual router as the one used for the first subscriber, and for which the Ipv6-NdRa-Prefix (VSA 26-129) returned from the RADIUS server in the Access-Accept message is the same IPv6 prefix as the statically configured value for the first subscriber, the second subscriber session is also brought up and not disconnected as expected.

  In such a scenario, the duplicate IPv6 prefix detection functionality does not cause the second subscriber session, which uses the same IPv6 prefix as the first subscriber session, to be rejected. Also, a new IPv6 route is installed for the second subscriber as a duplicate access-internal route. [Defect ID 187264]

- When you upgrade from certain releases to JunosE Release 9.2.0p1-0 or higher-numbered releases, descriptions configured for IP interfaces or IP subinterfaces are not retained across the upgrade when the descriptions are shorter than 9 characters in length. Additionally, VRF descriptions are not retained across the upgrade when the combined length of the VRF description and the VRF name is shorter than 9 characters. This behavior is seen during upgrades using a reload, stateful SRP switchover, or unified ISSU. Upgrades from the following releases are affected by this behavior:

  – 7.x.x

  – 8.0.x

  – 8.1.x, 8.2.x, and 9.x.x builds created before July 23, 2008

  Examples of descriptions that are not retained across the upgrade:

  host1(config-if)#ip description 12345678

  host1(config)#ip vrf 123
  host1(config-vrf)#description 45678

  Examples of descriptions that are retained across the upgrade:

  host1(config-if)#ip description longdescription

  host1(config)#ip vrf longername
  host1(config-vrf)#description 45678

  host1(config)#ip vrf 123
  host1(config-vrf)#description longdescription

  Work-around: Before you upgrade from an affected release to JunosE Release 9.2.0p1-0 or higher-numbered releases, ensure that you do the following:

  – Change IP interface and subinterface descriptions to 9 or more characters.

  – Change VRF descriptions, VRF names, or both so that the combination of associated VRF names and descriptions consists of 9 or more characters.

- The **ip tcp adjust-mss** command, which modifies the maximum segment size for TCP SYN packets traveling through the interface, is not supported on the ES2 10G LM or ES2 10G Uplink LM.
- If you have enabled ipInterface logging at a priority of debug, the acknowledgment that an interface has been deleted from the line modules can return to the SRP module after the layers beneath IP have deleted their interfaces. Consequently, the original name of the interface cannot be resolved or displayed in the log, and the system instead displays the ifIndex of the IP interface. This behavior has no functional effect other than that the log is misleading. However, previous log events indicate that the interface deletion was beginning.
- When you want to use a configuration script to configure IP shared interfaces that reference a physical interface, you must issue the **service show configuration format 2** command before you generate the script. If the default **show configuration** format (format 1) is enabled instead, the generated script cannot properly configure the IP shared interfaces because they are created before the physical interfaces. To properly configure the shared interfaces in this event, run the generated format 1 script twice.
- When you issue the **show ip forwarding-table** command for a particular slot, it is normal and appropriate behavior when the Status field indicates Valid while the Load Errors field is increasing daily for that VR. The Load Errors field records any failed routing table distribution attempt as an error. Attempts can fail for many reasons during normal operation; a failed attempt does not necessarily indicate a problem. It is normal to see many load errors per day. If the Status field indicates Invalid, then the routing table distribution has failed constantly for that VR and a real problem exists. You might occasionally see a status of Updating. However, if the Status field always indicates Updating, then again the routing table distribution has failed constantly for that VR, and a real problem exists.
- The enhancement to the CLI to support unnumbered reference to any kind of interface rather than just loopback interfaces has consequences such as the following: [Defect ID 47743]
  - If the references to shared interfaces appear in the **show configuration** output before the configuration for the interfaces they refer to, trying to restore such a configuration with a script generated from **show configuration** generates errors like the following:

    ```
    % Error, line 3929:
    host1(config-if)#ip share-interface FastEthernet 3/0.2
    % No such interface
    ```

  - Unnumbered interfaces that refer to nonloopback interfaces (for example, **ip unnumbered fastEthernet 3/0.2**) and that appear in the **show configuration** output before the interface referred to might generate similar no such interface errors.

  Work-around: Run the script twice.
- IP interface statistics become inconsistent when a slot is reset, because some traffic (such as control traffic) might be destined for the SRP module and is therefore counted elsewhere.

IPSec

- When you shut down the only outgoing IP interface to the IP destinations of IPSec tunnels, the tunnels remain in the up state rather than transitioning to down. As a consequence, all IP routes that use these tunnels as next hops also remain in the routing table. You can use dead keepalive detection (DPD) to avoid this situation. DPD must be active, which requires both IPSec tunnel endpoints to support DPD.
- During a warm restart after a system failover, the SRP module can take several minutes to resume the normal exchange of UDP/IP packets to applications. During this restart time, the E Series router does not send or receive dead peer detection (DPD) keepalives, which are used to verify connectivity between the router and its peers. The length of the restart time depends on the number of interfaces—if the restart time is too long, remote peers might determine that the connection from them to the E Series router is broken and then shut down an IPSec tunnel that has DPD enabled. In the worst case, all IPSec tunnels might be shut down. [Defect ID 65132]
- When the LAC–to–LNS data path runs over an MPLS tunnel and the MPLS tunnel originates or terminates at the LAC on an ES2 10G LM or an ES2 10G Uplink LM, the L2TP data traffic that originated or terminated at the LAC is discarded.

IS-IS

- When IS-IS is configured on a static PPP interface, the IS-IS neighbor does not come up if you remove the IP address from the interface and then add the IP address back to the interface.

  Work-around: When you remove and add back the IP address, you must also remove the IS-IS configuration from the interface and then add the configuration back to the interface by issuing the **no router isis** and **router isis** commands.
- When you run IS-IS on back-to-back virtual routers (VRs) in an IS-IS-over-bridged-Ethernet configuration and do not configure different IS-IS priority levels on each VR, a situation can occur in which both VRs elect themselves as the designated intermediate system (DIS) for the same network segment.

  This situation occurs because the router uses the same MAC address on all bridged Ethernet interfaces by default. When both VRs have the same (that is, the default) IS-IS priority level, the router must use the MAC address assigned to each interface to determine which router becomes the DIS. Because each interface in an IS-IS-over-bridged-Ethernet configuration uses the same MAC address, however, the router cannot properly designate the DIS for the network segment. As a result, both VRs elect themselves as the DIS for the same network segment, and the configuration fails. [Defect ID 72367]

  Work-around: To ensure proper election of the DIS when you configure IS-IS over bridged Ethernet for back-to-back VRs, we recommend that you use the **isis network point-to-point** command in Interface Configuration mode to configure IS-IS to operate using point-to-point (P2P) connections on a broadcast circuit when only two routers (or, in this case, two VRs) are on the circuit. Issuing this command tears down the current existing IS-IS adjacency in that link and reestablishes a new adjacency.

- If you perform a stateful SRP switchover operation on a router with IS-IS previously configured on the device, the IS-IS application takes longer than the normal duration (approximately 40 seconds) to restart after the switchover is completed. The time that it takes for IS-IS to restart after a stateful switchover causes a large delay in the transmission of hello packets with restart TLV (type 211) from the restarting router to neighboring routers. Because of the delay in transmission of hello packets to neighboring routers, active adjacencies are not maintained between the restating router and other routers in the IS-IS domain. To avoid adjacencies being reset, we recommend that you increase the hold timers for the IS-IS protocol to appropriate values, based on the level of complexity of the network and configuration settings, so as to enable IS-IS graceful restart to be completed successfully. [Defect ID 90546]

  The long duration for restart of a previously running application on the router also occurs if you configured OSPF on the router and perform a stateful SRP switchover process. This condition can occur even in environments that are not scaled to the maximum limits and contain minimal subscriber connections or attribute definitions.

  Because the IP application takes about 30-35 seconds to reinitialize and process control packets after a stateful SRP switchover, and the continual increase in the time needed for completion of IP reinitialization in JunosE releases (owing to consumption of system resources for enhanced functionalities), we recommend that you increase the hold timers for the associated protocols running on the router to necessary levels so that graceful restart can function properly.

L2TP

- L2TP peer resynchronization enables an L2TP failed endpoint to resynchronize with its peer non-failed endpoint. The JunosE Software supports failover protocol and silent failover peer resynchronization methods. If you configure the silent failover method, you must keep the following considerations in mind:
  - PPP keepalives—To ensure resynchronization of the session database, PPP keepalives must be enabled on the L2TP data path. Without PPP keepalives, silent failover might disconnect an established session if there is no user traffic during failover recovery.
  - Asymmetric routes on different line modules—Asymmetric routes whose receive and transmit paths use I/O paths on different line modules can result in improperly handled line module control packets. If your network does include this type of asymmetric route, tunnels using these routes might fail to recover properly.
- NAT dynamic translation generation affects the LNS session creation time. When NAT dynamic translations and LNS sessions are created simultaneously, NAT dominates the CPU cycles of the tunnel-service module, resulting in a delay in the LNS session creation rate. The LNS session creation rate returns to its normal rate when NAT dynamic translations are no longer being generated. [Defect ID 53191]

  Work-around: When signaling performance must be optimal, avoid the simultaneous configuration of NAT and LNS.

- If you create an L2TP destination profile profileName, establish tunnels with the profile, and then remove the profile, you cannot subsequently create another destination profile using that same profileName until all the tunnels drain from the previous instance of this destination profile. If you do not wait, the E Series router displays a message similar to the following:

  l2tp: Discarding incoming sccrq from vr default, remote address 192.168.100.1 - no destination profile.

- If you do not want to wait for the tunnels to drain, use a different name for the destination profile. [Defect ID 32973]

Line Module Redundancy

- On E120 routers and E320 routers, redundant IOAs have a temperature sensor, and the **show environment all** command lists the temperature of IOAs in their associated slots.

  On ERX routers, redundant I/O modules do not have a temperature sensor. Therefore, the **show environment all** command output lists the primary I/O module temperature in the slot of the line module that is responsible for the I/O module.

- When you install an ES2-S1 Redundancy IOA with a hardware revision number of -02 or less in slot 0 or slot 11 of the E320 router or in slot 0 or the E120 router, do not install an OCx/STMx ATM IOA or an OCx/STMx POS IOA in the lower (E320) or left (E120) adapter bay of slot 1 or slot 12. When the spare line module is controlling another slot and you revert back to the primary line module, the ATM or POS IOAs can become unusable or cause the line module to reset. [Defect ID 69760]

  Work-around: This problem is not present for ES2-S1 Redundancy IOAs with a hardware revision number of -03 or higher.

MLPPP

- Do not configure both MLPPP fragmentation (with the **ppp fragmentation** command) and IP fragmentation of L2TP packets (with the **ip mtu** command) on the same interface. Instead, you must choose only one of the fragmentation configurations by setting it to the necessary value and set the other fragmentation configuration to the maximum allowable value.

MPLS

- Martini circuits configured on the ES2 10G LM act as true layer 2 tunnels, without modifying the layer 2 headers. For this reason, Martini VLAN retagging is not currently supported.

- If you are upgrading to Release 7.1.0 or a higher-numbered release from a release numbered lower than Release 7.1.0, and have inter-AS option B or C configurations, you must explicitly configure MPLS on all inter-AS links, as in the following example:

  host1**#configure terminal**
  host1(config)**#interface fastEthernet 2/0**
  host1(config-if)**#ip address ...**
  host1(config-if)**#mpls**

- If you do not explicitly configure MPLS on the links, the inter-AS feature will not work properly. When you upgrade the router to JunosE Release 7.1.0 or a higher-numbered release from a release numbered lower than Release 7.1.0, remote ATM layer 2 over MPLS circuits (also known as MPLS shim interfaces) that use Martini encapsulation are erroneously signaled with the control word attribute setting "Control word is not preferred by default". Because control words are required for these MPLS shim interfaces, these circuits should instead be signaled with the setting "Control word is preferred by default".

  Work-around: To reinstate the proper setting ("Control word is preferred by default"), remove the MPLS shim interface from the ATM subinterface and then reconfigure it.

- You cannot use an underscore character (_) in an MPLS tunnel name.

Multicast

- The **ip dipe sg-cache-miss** and **ipv6 dipe** commands are not intended or supported for customer use, although they are visible in the User Exec and Privileged Exec modes respectively. These commands are intended to be used in a Juniper Networks internal lab environment for testing without a traffic generator.
- Do not configure a multicast group with more than 10,219 outgoing interfaces (OIFS) on the same ES2 10G LM. [Defect ID 81768]
- When you upgrade a router running a release earlier than JunosE Release 8.2.x to JunosE Release 8.2.x or higher-numbered releases, the Protocol Independent Multicast (PIM) configuration settings in VPN routing and forwarding (VRF) instances are not restored after the upgrade is completed. This problem happens only if you did not previously configure PIM on the parent virtual router (VR) for the VRF. This problem occurs with both IPv4 PIM and IPv6 PIM configurations on the router.

  After the completion of the upgrade process, if you attempt to restore the PIM configuration directly on the VRF, an error message is displayed. For example, if you try to restore the IPv4 PIM settings on the VRF using the **router pim** command, the following error message is displayed:

```
host1:vrf01(config)#router pim
% PimIp not configured on this router
```

  Work-around: To correct this problem after you upgrade a router running a release earlier than JunosE Release 8.2.x to JunosE Release 8.2.x or higher-numbered releases, you need to restore the PIM configuration on the upgraded router in two steps (first, on the parent VR, and then, on the VRF), instead of attempting to restore the PIM configuration directly on the VRF.

  To restore IPv4 PIM configuration on the VRF, perform the following steps. These steps assume that a parent VR context, named "parent", and a VRF in the parent VR, named "vrf01", are already configured on the router.

  1. Access the context of the parent VR, and create and enable IPv4 PIM on the parent VR.

     host1(config)#virtual-router parent
     host1:parent(config)#router pim

2. Enter the VRF Configuration mode to restore PIM settings on the VRF in the parent VR.

```
host1:parent(config)#virtual-router parent:vrf01
```

3. Create and enable IPv4 PIM on the VRF in the parent VR.

```
host1:parent:vrf01(config)#router pim
```

After the IPv4 PIM configuration is recovered on the VRF, you can remove the IPv4 PIM configuration settings on the parent VR by using the **no router pim** command, if necessary.

To restore IPv6 PIM configuration on the VRF, perform the following steps. These steps assume that a parent VR context, named “parent”, and a VRF in the parent VR, named “vrf01”, are already configured on the router.

1. Access the context of the parent VR, and create and enable IPv6 PIM on the parent VR.

```
host1(config)#virtual-router parent
host1:parent(config)#ipv6 router pim
```

2. Enter the VRF Configuration mode to restore PIM settings on the VRF in the parent VR.

```
host1:parent(config)#virtual-router parent:vrf01
```

3. Create and enable IPv6 PIM on the VRF in the parent VR.

```
host1:parent:vrf01(config)#ipv6 router pim
```

After the IPv6 PIM configuration is recovered on the VRF, you can remove the IPv6 PIM configuration settings on the parent VR by using the **no ipv6 router pim** command, if necessary.

Packet Mirroring

- The ES2 10G LM supports the packet mirroring feature when the module is paired with the ES2-S2 10GE PR IOA, the ES2-S1 GE-8 IOA, or the ES2-S3 GE-20 IOA. When you use the ES2 10G LM with these IOAs, CLI-based interface-specific mirroring is not supported.
- When both interface-specific mirroring and user-specific mirroring are configured on the same interface, the interface-specific secure policies take precedence. The interface-specific secure policies, which you manually attach using the CLI, override and remove any existing secure polices that were attached by a trigger action. If the interface-specific secure polices are subsequently deleted, the original trigger-based secure policies are not restored.
- Typically, when configuring packet mirroring, you configure a static route to reach the analyzer device through the analyzer port. If the analyzer port is an IP-over-Ethernet interface, you must also configure a static Address Resolution Protocol (ARP) entry to reach the analyzer device. However, because only a single static ARP entry can be installed for a given address at any given time, when you are using equal-cost multipath (ECMP) links to connect to the analyzer device, the static ARP

configuration does not provide failover if the link being selected fails or is disconnected. Therefore, to provide continued connectivity if the link fails when using ECMP, enable the **ip proxy-arp unrestricted** command on the next-hop router for each ECMP interface. As a result, when the link fails, the router sends an ARP request to identify the MAC address of the analyzer device and gets a response over the new link.

Policy Management

- The ES2 10G LM does not support the deprecated **next-hop** command.
- You cannot configure classifier lists that reference multiple fields for a VLAN policy list on the ES2 10G Uplink LM or the ES2 10G LM, with the exception of traffic-class and color. The system incorrectly classifies VLAN policies that classify using multiple fields. For example, an invalid policy list that references multiple fields uses both color and user-packet-class, or one classifier list using color and another using user-packet-class.
- In rare cases, some policy configurations that use CAM hardware classifiers from releases earlier than Release 7.1.0 can fail because they exceed the total hardware classifier entry size of 128 bits that was introduced in Release 7.1.0. For more information and examples of previous configurations, see *JunosE Policy Management Configuration Guide, Chapter 8, Policy Resources.*
- Multiple Forwarding Solution Rules for a Single Classifier List in a Policy

  Before Release 5.2.0, it was possible to configure a policy with multiple rules that specified forwarding solutions where all of these rules were associated with a single classifier list. This typically was a configuration error, but the CLI accepted it. Beginning with Release 5.2.0, the CLI no longer accepts this configuration.

  - Multiple forwarding rules behavior for releases numbered lower than Release 5.2.0:

    - If multiple forward or filter rules were configured to reference the same classifier list in a single policy, then all rules except the first rule configured were marked as eclipsed in the **show policy** command display. Next-interface and next-hop rules were treated in the same manner. The eclipsed rules were not applied.
    - If a policy were configured with one rule from the [forward, filter] pair and one rule from the [next-hop, next-interface] pair, and if both rules referenced the same classifier list, then no visible eclipsed marking occurred. However, these two rules were mutually exclusive, and only one of them defined the forwarding behavior. The rule action that was applied was in the order (from highest to lowest preference): next interface, filter, next hop, forward. The applied rule was the rule whose behavior was seen by forwarded packets.

      For example, if a policy had both a next-interface and a filter rule, then the next interface was applied. If a policy had a next-hop and a filter rule, then the filter rule was applied.

– Multiple forwarding rules behavior for Release 5.2.0 and higher-numbered releases:

Beginning with Release 5.2.0, the multiple rules behavior is designed so that when a forwarding solution conflict occurs within a policy, such as those described earlier, the second forwarding solution overwrites the preceding solution. That is, the last forwarding rule configured for the given classifier list within a policy is the forwarding behavior that is used. Also, a warning message is now displayed when this type of conflict occurs.

Example 1—In this example, the filter rule action overwrites the forward rule, and is therefore applied.

```
host1(config)#policy-list wstPolicyList
host1(config-policy-list)#forward classifier-group svaleClacl1
host1(config-policy-list)#filter classifier-group svaleClacl1
WARNING: This rule has replaced a previously configured rule.
host1(config-policy-list)#exit
host1(config)#
```

Example 2—In this example, three forwarding solution conflicts result in rules being overwritten. The filter rule is the last rule configured, and is therefore applied.

```
host1(config)#policy-list bostTwo
host1(config-policy-list)#forward classifier-group clacl5
host1(config-policy-list)#next-hop 1.1.1.1 classifier-group clacl5
WARNING: This rule has replaced a previously configured rule.
host1(config-policy-list)#next-interface atm 1/0.0 classifier-group clacl5
WARNING: This rule has replaced a previously configured rule.
host1(config-policy-list)#filter classifier-group clacl5
WARNING: This rule has replaced a previously configured rule.
host1(config-policy-list)#exit
host1(config)#
```

Informational Note: When you upgrade the nonvolatile memory to Release 5.2.0 or later, the upgrade removes eclipsed rules and rules whose behavior was not applied in the previous release. This removal ensures that the postupgrade forwarding behavior is the same as the preupgrade behavior.

Informational Note: If you upgrade to Release 5.2.0 or later and then configure your router using a script generated before Release 5.2.0, the postupgrade and preupgrade forwarding behaviors might not be the same. The new Release 5.2.0 configuration behavior is applied—the last policy rule configured for a given classifier list that specifies a forwarding behavior is the only rule remaining.

- Although it is not required, you can enclose the name of the classifier when you use the **show classifier-list** *classifierName* command and the name of the policy list when you use the **show policy-list** *policyName* command within double quotation marks. This method of specification of policy and classifier names ensures that the CLI interface does not process the abbreviated forms of the names as system-defined keywords, such as **brief** and **detailed**, available with **show policy-list** and **show classifier-list** commands.

For example, if you specify the **show policy-list b** command without enclosing the letter "b" within double quotation marks, assuming a policy list with the name "b" has been configured, the system auto-completes the letter "b" as brief and considers the command to denote a condensed display of policy lists (equivalent of **show policy-list brief** command). Similarly, if you enter the **show classifier-list d** command to display the details of a configured classifier list with the name "d", the CLI interface processes the command as a listing of classifier details (equivalent of **show classifier-list detailed** command).

To avoid incorrect and unexpected behavior in the output of the **show classifier-list** *classifierName* and **show policy-list** *policyName* commands, you must enclose the names of policy lists and classifier lists while using these commands within double quotation marks, especially if the names of the policy and classifier lists begin with letters that match the auto-complete forms of keywords. If the names of the policy and classifier lists do not match the beginning letters of the keywords or if you enter the full names of the policy and classifier lists, the system accurately processes the names even if you do not enclose them within double quotation marks while using these commands.

- No logs are created if you use the **policy-list** option with the **log severity** *severityValue* **policyMgrPacketLog policy-list policyListName** command when logging policyMgrPacketLog events.
- When you attach a policy to an interface and the policy contains a classifier rule that is unsupported for that interface, the CLI generates a message and the policy is applied. However, if an existing policy is already attached to that interface, then support for the new policy is not checked and the invalid policy is applied to the interface without warning. The results of this attachment are not predictable.

PPP

- The GE-2 line module does not support dynamic IP interfaces over static PPP interfaces when the PPPoE subinterface is also static. The OC3/STM1 GE/FE line module does not support dynamic IP interfaces over static PPP interfaces when the ATM interface column is also static.

PPPoE

- On the ES2 4G LM, ES2 10G LM, and ES2 10G Uplink LM, data packets for PPPoE are not counted at the PPPoE interface. Instead, PPPoE data packets are counted at the PPP interface that sits on the PPPoE interface. Use the **show ppp interface** command to display the data packets. Control packets for PPPoE are counted at the PPPoE interface; use the **show pppoe interface** command to display the control packets.

QoS

- In JunosE Releases 7.1.x, 7.2.x, and 7.3.x, you can attach a QoS profile to Ethernet interfaces that are configured in a link aggregation group (LAG) interface. However, beginning with JunosE Release 8.0.1, you can attach a QoS profile directly to the LAG interface. As of JunosE Release 8.0.1, the software restricts you from attaching a QoS profile to any Ethernet interfaces that are members of a LAG. [Defect ID 84632]

Work-around: Prior to upgrading from JunosE Releases 7.1.x, 7.2.x, or 7.3.x to JunosE Release 8.0.x or higher-numbered releases, remove the QoS profile from the Ethernet interface. When you have successfully upgraded to JunosE Release 8.0.x or higher-numbered releases, reattach the QoS profile to the LAG interface.

- In Release 7.2.0 and higher-numbered releases, you can configure the simple shared shaper to select scheduler nodes in a named traffic-class group as active constituents.

  By default, simple implicit shared shapers activate scheduler nodes in named traffic-class groups. The implicit constituent selection process is now the same for both simple and compound shared shapers.

  This is a change in default behavior. For releases before Release 7.2.0, you could not configure scheduler nodes as active constituents of the simple shared shaper, except for the best-effort node.

  To recover the default behavior available before Release 7.2.0, or to select active constituents that are different, use simple explicit shared shapers to select best-effort nodes only.

- When you are configuring compound shared shaping using explicit constituents and you explicitly specify both a scheduler node and a queue stacked above the node as constituents of the shared shaper, the system selects the scheduler node (but not the queue) as the constituent.

- The router cannot resolve inconsistent requests caused by two QoS profiles that modify the same scheduler property inconsistently.

  Work-around: Avoid using two QoS profiles that modify the same scheduler property inconsistently, such as setting different values for the shaping rate for the same S-VLAN node.

- When you perform an SNMP walk of the juniQosQueueStatistics MIB, a timeout of up to 5 minutes ensues, during which the SRP module CPU utilization goes to 100 percent.

- Egress strict-priority packets may experience high latency on OC3/STM1 ATM interfaces associated with the LM if you have shaped the port rate to more than 148.5 Mbps.

  Work-around: To ensure low strict-priority latency, shape the port rate to no more than 148.5 Mbps.

- An error message regarding the qos-parameter instance QosParameterDefinition is erroneously generated on an ERX1440 router when it is configured for L2C and QoS RAM and receives TLV 144 (DSL Type). The parameter instantiation actually functions properly.

- On the E120 and E320 routers, you cannot attach QoS profiles to L2TP tunnels by means of the CLI because the CLI does not pass the router ID to QoS.

- PPP sessions may be dropped if you change the shaping rate in a QoS profile that affects thousands of circuits while QoS traffic affected by the profile is being forwarded.

  Work-around: Do not change the shaping rate in a QoS profile that affects thousands of circuits while QoS traffic is using the profile.

- Egress traffic may be dropped on OC12/STM4 ATM interfaces if you have shaped the port rate to more than 542 Mbps.

  Work-around: Do not exceed a shaped port rate of 542 Mbps.

- Incorrect output is sent to the CLI the first time you enter Global Configuration mode or issue the **show subscribers** command after viewing the VLAN subinterface over which a subscriber is connected.

RADIUS

- JunosE Software provides extended commands for configuring the formats of the RADIUS NAS-Port attribute (attribute 5) and the RADIUS Calling-Station-ID attribute (attribute 31) when the physical port value is greater than 7.

  When the physical port value is greater than 7:

  – An incorrectly configured NAS-Port attribute format results if you use either the **radius nas-port-format 0sssppp** or **radius nas-port-format ssss0ppp** command.

  – An incorrectly configured Calling-Station-ID attribute results if you use either the **radius calling-station-format fixed-format** command or the **radius calling-station-format fixed-format-adapter-embedded** command.

  Work-around: Use the following commands on routers that have line modules with more than 7 physical ports:

  – To configure the NAS-Port attribute format, use the **radius nas-port-format extended [atm | ethernet]** command.

  – To configure the Calling-Station-ID attribute format, use the **radius calling-station-format fixed-format-adapter-new-field** command.

SNMP

- SNMP MIBs

  Information about all the SNMP MIBs (both standard and proprietary) that the router supports in this release is available in the MIB directory in the SW_Image_CD-2 folder of the JunosE Software image bundle, which you downloaded from the Juniper Networks website, that contains the release file for E120 and E320 routers.

- Some Juniper Networks SNMPv1-formatted traps contain an incorrect object identifier (OID) in the SNMPv1-Trap-PDU enterprise field. An SNMPv2 trap is typically identified by an OID that ends in the form ...x.y.z.0.n. This OID appears, in full, as the value of the snmpTrapOID.0 object in the varbind list of an SNMPv2-formatted trap. In the corresponding SNMPv1-formatted trap, this OID is broken down into subcomponents that fill the SNMPv1-Trap-PDU enterprise field (...x.y.z) and specific trap number field (n); the zero is unused.

  The SNMPv1-formatted versions of the following Juniper Networks traps incorrectly contain ...x.y.z.0 in the SNMPv1-Trap-PDU enterprise field. That is, a zero is mistakenly appended to the correct enterprise OID value.

Trap Name	Expected Enterprise OID	Enterprise OID Sent by SNMP Agent
junidApsEventSwitchover	.1.3.6.1.4.1.4874.3.2.2.1.2	.1.3.6.1.4.1.4874.3.2.2.1.2.0
junidApsEventModeMismatch	.1.3.6.1.4.1.4874.3.2.2.1.2	.1.3.6.1.4.1.4874.3.2.2.1.2.0
junidApsEventChannelMismatch	.1.3.6.1.4.1.4874.3.2.2.1.2	.1.3.6.1.4.1.4874.3.2.2.1.2.0
junidApsEventPSBF	.1.3.6.1.4.1.4874.3.2.2.1.2	.1.3.6.1.4.1.4874.3.2.2.1.2.0

Trap Name	Expected Enterprise OID	Enterprise OID Sent by SNMP Agent
junidApsEventFEPLF	.1.3.6.1.4.1.4874.3.2.2.1.2	.1.3.6.1.4.1.4874.3.2.2.1.2.0
juniAddressPoolHighAddrUtil	.1.3.6.1.4.1.4874.2.2.21.3	.1.3.6.1.4.1.4874.2.2.21.3.0
juniAddressPoolAbatedAddrUtil	.1.3.6.1.4.1.4874.2.2.21.3	.1.3.6.1.4.1.4874.2.2.21.3.0
juniAddressPoolNoAddresses	.1.3.6.1.4.1.4874.2.2.21.3	.1.3.6.1.4.1.4874.2.2.21.3.0
juniDhcpLocalServerPoolHighAddrUtil	.1.3.6.1.4.1.4874.2.2.22.3	.1.3.6.1.4.1.4874.2.2.22.3.0
juniDhcpLocalServerPoolAbatedAddrUtil	.1.3.6.1.4.1.4874.2.2.22.3	.1.3.6.1.4.1.4874.2.2.22.3.0
juniDhcpLocalServerPoolNoAddresses	.1.3.6.1.4.1.4874.2.2.22.3	.1.3.6.1.4.1.4874.2.2.22.3.0
pimNeighborLoss	.1.3.6.1.3.61.1	.1.3.6.1.3.61.1.0

Work-around: Use the OIDs that the SNMP agent sends.

- When you configure the router with an address pool that has two IP address ranges, only the range that you configured first is available via the MIB.

SRC Software and SDX Software

- The SRC client does not prevent you from changing the name of the router while the client is connected to the SAE, resulting in SAE issues such as lost IP addresses and stale users.

  Work-around: To change the router name while the SRC client is connected to the SAE, shut down the SRC client, change the name, then re-enable the SRC client.

- In a network in which approximately 40,000-45,000 IP interfaces are managed by an SRC client on an E Series router, if you enter the **sscc enable** command to enable the SRC client after it was previously disabled, the CLI interface stops responding and is not accessible for about 15 minutes. [Defect ID 187946]

SSH

- If the SRP module restarts when SSH is configured in a VR other than default, SSH can sometimes become disabled. This happens if SSH attempts to bind with a VR before the VR comes back up after the restart. In this event, a warning message is generated to alert you to the fact that SSH is disabled in that VR. You must manually re-enable SSH either by accessing the console VTY or creating a Telnet session to the router.

Stateful SRP Switchover (High Availability)

- Additional processing is required to maintain and mirror the necessary state information that enables subscriber sessions to stay up across an SRP failover. As a result, the performance of other control plane functions is reduced. Specifically, call setup rates are lower than in previous releases.

Informational Note: Rapid call setup rates are most important following an outage that causes all subscribers to drop, because many of the dropped subscribers will immediately attempt to reconnect. This type of outage occurs far less frequently with stateful SRP switchover.

We have ongoing development activities to characterize and improve call setup rates in future releases.

- Stateful SRP switchover remains inactive for 20 minutes after an initial cold-start or cold-restart of the router. This delay enables the system to reach a stable configuration before starting stateful SRP switchover.

  If you want to override the 20-minute timer, turn high availability off by using the **mode file-system-synchronization** command, and then on again by using the **mode high-availability** command.

- When IP tunnels are configured on a router enabled for stateful SRP switchover, and the Service Module (SM) carrying these tunnels is reloaded, stateful SRP switchover transitions to the pending state. Stateful SRP switchover remains in the pending state for 10 minutes following the successful reloading of the SM. This amount of time allows for IP tunnel relocation and for the tunnels to become operational again on the SM. If an SRP switchover occurs while in the pending state, the router performs a cold restart.

  Work-around: None.

- After a stateful SRP switchover, each layer of the interface columns must reconstruct its interfaces from the mirrored information. While the interfaces are being reconstructed the SRP module cannot send or receive frames, including the protocol frames that signal graceful restart behavior with OSPF and IS-IS peers. If the configured hold time is too short, peers might mistakenly declare the adjacency down during the time in which the graceful restart is taking place. [Defect ID 65132]

  Work-around: Increase the hold time to provide sufficient time for interface synchronization before the peers declare the adjacency down.

  – For OSPF, use the **ip ospf dead-interval** command to set the hold time. We recommend that you use Bidirectional Forwarding Detection (BFD) with a longer OSPF dead interval to achieve fast failure detection.

  – For IS-IS, use the **isis hello-interval** and **isis hello-multiplier** commands to set the hold time.

  We recommend the following hold times for each protocol, based on the number of interfaces.

Interface Count	Recommended Hold Time for OSPF	Recommended Hold Time for IS-IS
16000 or less	80 seconds	50 seconds
16001 to 32000	87 seconds	55 seconds
32001 to 48000	90 seconds	70 seconds

- When you issue **show** commands as soon as the CLI is available after a stateful SRP switchover, the commands can hang until the warm restart is completed.

Subscriber Interfaces

- MAC address validation is not supported on either of the following:
  - Packet-triggered subscriber interfaces that are created dynamically
  - Packet-triggered subscriber interfaces that are managed on the primary IP interface

  A packet-triggered subscriber interface is created when the router receives a packet with an IP source address that does not match any entries in the demultiplexer table. When the router detects an unmatched packet, it generates a trigger event that determines whether to create a dynamic subscriber interface or configure an existing interface. To configure packet detection on the router, use the **ip auto-detect ip-subscriber** command.

System

- ERX routers display different behavior from E120 routers and E320 routers when reporting modules as inactive.

  ERX routers report a module as inactive when either:
  - The I/O module is not present
  - The primary line module is fully booted and ready to resume operation. In this case, the standby is currently providing services.

  E120 routers and E320 routers report a module as inactive when either:
  - The primary line module has no IOAs.
  - The primary line module has IOAs, but they have failed diagnostics.
  - The standby line module has taken over for the primary line module, and has control of the IOAs.

  Because E120 and E320 routers can accommodate up to two IOAs per slot, at least one IOA must be online. If the second IOA fails, the line module is still online, but does not use both IOAs. You can ensure that every module is up and active in the system and not in a failed state by issuing the **show version all** command.
- In a router with a redundancy group that does not span quadrants (for example, a three-slot redundancy group that spans slots 0, 1, and 2 in an ERX1410 chassis), the potential bandwidth of the redundant module is erroneously included in the quadrant bandwidth calculation. The **show utilization** command might indicate that the bandwidth is exceeded for modules in that group. [Defect ID 31034]
- When you copy the running configuration to NVS, the E Series router verifies whether it has available space equal to at least twice the size of the .cnf file. If the space is insufficient, you cannot complete the copy. [Defect ID 40655]

  Work-around: Make sufficient space on the NVS by deleting .rel or .cnf files.
- You cannot delete the ipInterface log after you delete the corresponding IP interface. This does not prevent you from adding filters to other interfaces, nor does it prevent you from adding a filter to the same interface if you re-create it after deletion. [Defect ID 34842/45063]

  Work-around: Remove the filter before you remove the interface. Alternatively, if you remove the interface first, then you must remove all filters associated with all IP interfaces.

System Logging

- If you enable engineering logs and set the control network logs to a level of notice or lower (down from the default of error), you might see erroneous controlNetwork log messages like the following that are generated because SNMP polling on line modules (correctly) detects no fabric: [Defect ID 43168]

  NOTICE 09/01/2002 18:47:52 CEST controlNetwork (slot 11): Control Bus Master slave error 0x5 while accessing slot

- The **show configuration category management syslog virtual-router default** command incorrectly displays logs for multiple syslog destinations when you add a log to only one syslog destination. The **show log configuration** command shows the correct configuration.

Tunneling

- When you configure the GE-2 line module or the GE-HDE line module with a shared tunnel-server port, the available bandwidth for tunnel services is limited to 0.5 Gbps per module. When you configure the ES2 4G line module with a shared tunnel-server port, the available bandwidth for tunnel services is limited to 0.8 Gbps per module.
- In releases numbered lower than Release 7.3.0, a dynamic tunnel-server port was located on port 8 of the GE-HDE line module and GE-8 I/O module.

  In Release 7.3.0 and higher-numbered releases, the dynamic tunnel-server port is located on port 9. When you upgrade to Release 7.3.0, any existing tunnel-server port configurations move from port 8 to port 9.

Unified ISSU

- ATM line modules might reset after a unified ISSU when you attempt to add memory to a VLAN subinterface in a large bridged Ethernet configuration.

Known Problems and Limitations

This section identifies the known problems and limitations in this release. For more information about known problems that were discovered at customer sites, you can log in to the JunosE Knowledge Base at https://www2.juniper.net/kb/, enter the defect ID number in the Search by Keyword field, and click Search.

ANCP

- On an E320 router that has established 3000 ANCP adjacencies with a client and traffic is initiated, the following behavior occurs sporadically: All existing Telnet sessions are disconnected and no new Telnet sessions can be established for several minutes. [Defect ID 83872]

ATM

- The line module resets when you issue the **show nbma arp** command after you have configured NBMA interfaces on an ATM line module. [Defect ID 88491]
- When 16,000 PPPoA interfaces are configured on an OCx/STMx ATM line module paired with an OC3-4 I/O module in an ERX14xx model, ERX7xx model, or ERX310 router, Ping traffic passing through the line module on the restarting router experiences an outage of 103 seconds, which is beyond the maximum limit, after a unified ISSU from JunosE Release 9.2.0p1-0 to 9.3.0p0-12. This outage does not occur when the same configuration is applied on a Gigabit Ethernet interface. [Defect ID 179794]
- The inPacketOctetDiscards counter in the output of the **show atm vc atm** *interface* **vcd** command includes both inBytesDropped and inBytesUnknownProtocol statistics. The inBytesUnknownProtocol statistics should be displayed by a separate counter.

  At the major interface level, the inPacketDiscards counter includes both inPacketsDropped and inPacketUnknownProtocol statistics. The inPacketUnknownProtocol statistics should be displayed by a separate counter. [Defect ID 44286]
- When a mirror rule that triggers on username is employed for packet mirroring of dynamic IP subscribers over ATM, removal of the rule does not disable packet mirroring. [Defect ID 175356]

  Work-around: Use a mirror rule that triggers on account session ID rather than on username.
- When you issue the **no atm atm1483 auto-configure** *upperInterfaceType* **lockout-time** command in Profile Configuration mode, the lockout time range does not revert to the default values. [Defect ID 66544]
- When one or more ATM1483 attributes appears in a profile, the **show configuration include-defaults** command fails to display the default values for all possible ATM1483 attributes. [Defect ID 67157]
- The output of the **show atm arp** command displays only 4096 entries when the line module is configured with more than 4096 NBMA ARP entries. [Defect ID 68849]
- The **baseline interface atm** command fails for a VCD assigned by the router to F4 OAM circuits. [Defect ID 174482]
- Unified ISSU is not supported when ILMI is configured on ATM interfaces. [Defect ID 176007/177297]
- ATM line modules reset after unified ISSU completes at the LAC when an MLPPP bundle with three links are tunneled to the LNS. [Defect ID 178821]
- For PPPoE, the AAL5 inPacket Discards counter might increment erroneously during call setup when a packet is passed directly to PPPoE for negotiation rather than being discarded. [Defect ID 51757]

  Work-around: Incremental InPacketDiscards during call setup do not necessarily indicate a problem. However, we recommend you investigate an excessive count because that might indicate a connection that cannot be successfully brought up for some reason, such as RADIUS denials or improper configuration.

BFD

- After you have shut down the interface to the next hop (for the route that is used to establish the BFD session), output for the **show bfd session** command erroneously indicates the shutdown interface as Management Interface (FastEthernet 6/0). [Defect ID 174271]

BGP

- The BGPv6 application incorrectly includes the null address (0.0.0.0) as the nexthop address in the update messages for IPv6 routes. [Defect ID 91489]

CLI

- When you issue a **run show ppp** command, the CLI changes the configuration level of the command line to Global Configuration mode rather than remaining at the level from which you issued the command. [Defect ID 52165]

  Work-around: Reissue the commands necessary to reenter the desired mode.

- The **logout subscribers all** command may not log out all of the DHCP subscribers. Although the bindings and DHCP addresses are cleared, the **show subscribers summary** command may display some of the DHCP subscribers. [Defect ID 180176]

  Work-around: Try using the **dhcp delete-binding all** command. If this does not clear the subscribers, you may want to reload the line module to avoid further issues.

DHCP

- DHCP packets are not forwarded to the DHCP server over dynamically created interfaces when all of the following are true: [Defect ID 180343]
  - DHCP relay or DHCP relay proxy is configured on the router.
  - The client-facing interfaces are created dynamically using bridged Ethernet over static ATM PVCs.
  - The **ip auto-detect ip-subscriber** command is configured to enable packet detection (packet triggering) and to trigger creation of dynamic subscriber interfaces.

  Work-around: To avoid this defect, do all of the following:
  - Do not use the **ip auto-detect ip-subscriber** command to enable packet triggering and to create dynamic subscriber interfaces
  - Ensure that DHCP external server is configured in the virtual router.
  - Ensure that the **set dhcp relay inhibit-access-route-creation** command is configured in the virtual router to prevent DHCP relay from installing host routes by default.

DHCP External Server

- With the unique client ID option enabled, when two clients with the same MAC address or client ID are on an interface (where one client is connected over a router and relay and the other client is connected directly), sending a release request from one of the clients might terminate another client. [Defect ID 179759]
- The DHCP renew counter and release counter (displayed with the **show ip dhcp-external statistics** command) are doubled rather than incremented for each renew and release sent. [Defect ID 78802]

- When DHCP clients on an S-VLAN over bridged Ethernet stack configuration send a decline message to a router that has DHCP relay and DHCP external server configured in the same VR, the clients bindings are not removed from the DHCP external server. [Defect ID 87086]
- When DHCP relay and DHCP external server are configured in the same VR with server-sync enabled, bindings are not created in the DHCP external server when DHCP clients on an ATM bulk configuration interface stack and dynamic VLAN over Ethernet stack sends a renew message. [Defect ID 87087]

DoS Protection

- A Telnet session closes when sending ipLocalBGP protocol traffic at a rate in the range 4096–4200 packets per second (pps) with suspicious control flow detection enabled. [Defect ID 81974]

  Work-around: When the traffic drops below 4096 pps, open a new Telnet session.

Ethernet

- When autonegotiation is enabled on Gigabit Ethernet interfaces with the **speed automatically negotiate** command, issuing the **link selection** command logs out subscribers. [Defect ID 87185]

  Work-around: Use the following commands to enable auto link selection (GE port redundancy) and to switch from one port to the other port:

  host1(config-if)#**no link selection**
  host1(config-if)#**link fallover force**

File System

- When the primary SRP module is running JunosE Release 7.2.0 or higher-numbered release and the standby SRP module is running a release numbered lower than Release 7.2.0 (as in a downgrade situation), you cannot display the files for the standby SRP module. [Defect ID 74104]

Forwarding

- When performing MAC validation to match subscriber demux entries with ARP host entries, the ES2 10G LM does an exact match, rather than a longest prefix match. The subscriber demux entry source address must be a /32 value matching the IP address of an ARP entry in order to validate the MAC address against that ARP entry. [Defect ID 79641]
- When you attach certain hierarchical policies to subinterfaces as input policies, secondary input policies, and output policies, incoming traffic loss can occur when the number of subinterfaces to which the policies are attached exceeds 4600. [Defect ID 86741]
- When PPPoE over LAG is configured on an interface, and you re-execute the PPPoE-over-LAG configuration before you delete the previous configuration, the ES2 10G LM line module resets. [Defect ID 179639]

  Work-around: Before you can re-execute the PPPoE-over-LAG configuration, delete the existing PPPoE-over-LAG configuration.

- Specifying S-VLAN ranges that partially overlap does not work. [Defect ID 81918]

  For example, the following configuration fails because S-VLAN 22 falls within the previously specified S-VLAN range of 21–23.

  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 21 23 401 426**
  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 21 23 427 712**
  host1(config-if)#**vlan bulk-config BulkCezarCnfg2 svlan-range 22 22 101 110**

  Work-around: You can do either of the following to avoid this problem.

  – Specify each S-VLAN within the partially overlapping range as individual S-VLANs, as in the following example:

  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 21 21 401 426**
  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 22 22 401 426**
  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 23 23 401 426**
  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 21 21 427 712**
  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 22 22 427 712**
  host1(config-if)#v**lan bulk-config BulkDHCPCnfg1 svlan-range 23 23 427 712**
  host1(config-if)#**vlan bulk-config BulkCezarCnfg2 svlan-range 22 22 101 110**

  – Use fully overlapping ranges rather than partially overlapping ranges, as in the following example:

  host1(config-if)#**vlan bulk-config BulkDHCPCnfg1 svlan-range 21 23 401 426**
  host1(config-if)#**lan bulk-config BulkDHCPCnfg1 svlan-range 21 23 427 712**
  host1(config-if)#**vlan bulk-config BulkCezarCnfg2 svlan-range 21 23 101 110**

- Ethernet statistics are incorrectly displayed for virtual port 8 of the ES2-S1 GE-8 IOA when that module is paired with the ES2 10G LM or the ES2 10G Uplink LM. [Defect ID 174784]
- The ES2 10G LM does not support framed routes configured for dynamic subscriber interfaces. [Defect ID 83154]
- On the ES2 10G LM, a VLAN ID of 0 assigned to an interface can prevent packets from being properly forwarded. [Defect ID 176125]
- If you perform unified ISSU from JunosE Release 11.3.0 to a higher-numbered release on a router chassis with an ES2 10G ADV LM that contains a shared tunnel-server port or a dedicated tunnel-server port, the LM resets. The existing dedicated and shared tunnel-server sessions that were configured to terminate on the ES2 10G ADV LM are dropped when the LM resets. The LM comes back online, running the release to which it was upgraded, after it completes the generation of a core dump file. Also, new tunnel-server sessions are established correctly after unified ISSU is completed. [Defect ID 187728]

GRE

- After a stateful SRP switchover operation, if you delete the shared tunnel-server port configured on an LM and configure the shared tunnel-server port on another LM, the GRE tunnels are not transferred from the LM on which the tunnel-server port was deleted to the LM on which the tunnel server was configured. The removed tunnels do not come up until you perform an event that triggers the restoration of the GRE tunnels, such as addition of new tunnels, deletion of other existing tunnels, or configuration of an LM on the router chassis. This problem occurs only with GRE tunnels after the completion of a stateful SRP switchover procedure. [Defect ID 187804]

Work-around: To correct this problem, create a dummy GRE tunnel interface for temporary purposes using the **interface tunnel** command. Creation of the dummy tunnel interface causes the previously-configured GRE tunnel-service interfaces to be restored on the changed shared tunnel-server port on the LM. You can delete the dummy tunnel interface after all the GRE tunnel interfaces are up.

ICR

- If you saved the running configuration of the router as a script file (.scr) and execute the script to apply the settings on the router, ICR partition configuration commands in the .scr file might fail to add group members to the partition. This problem happens when the subscriber configuration in the .scr file is placed before the ICR partition configuration. However, this problem does not occur if you used a system configuration (.cnf) file to set up the router. [Defect ID 183913]

  Work-around: To correct this problem and enable ICR partitions to be created correctly, make sure that you add the ICR partition configuration before the subscriber interface configuration in the .scr file. You can perform this reordering by modifying the .scr file to place the commands that configure subinterfaces for ICR partitions before the commands used for VLAN-based or S-VLAN-based grouping of subscribers.

- When you configure ICR settings using a CLI macro, ICR commands are run in quick succession. Sometimes, in such a scenario, the active SRP module resets if the event that causes the change of state of the VRRP instance reaches the ICR application before the ICR partition has been created. [Defect ID 184095]

  Work-around: To avoid this problem, add an additional delay of one second using the **sleep** command in the macro, before the **ip vrrp** *vrid* **enable** command that is written in the macro to enable VRRP instance.

  For example, consider a macro that contains the following commands:

  ip vrrp *vrid* **enable**
  ip vrrp *vrid* **icr-partition** *partitionId*

  Modify the macro, as follows, to add a delay of one second before the VRRP instance ID is enabled on the router and a delay of another second before the ICR partition that corresponds to the VRRP instance is created:

  sleep 1
  ip vrrp *vrid* **enable**
  sleep 1
  ip vrrp *vrid* **icr-partition** *partitionId*

IGMP

- The E Series router IGMPv3 proxy does not operate correctly in the presence of IGMPv2 queriers. [Defect ID 46039/46045]

  Work-around: If an IGMPv2 router is present on the network, do not configure version 3 with the **ip igmp-proxy version** command on that network interface. (Version 2 is the default.)

- The default value for the IGMPv3 proxy unsolicited report interval timer should be 1 second rather than 10 seconds (the value for v2). [Defect ID 46040]

- When more than about 100,000 mapped OIF entries are configured on a virtual router, issuing the **no virtual router** command for this and other virtual routers does not delete all the virtual routers within the deletion timeout interval (3 minutes). The virtual routers do eventually delete after this timeout. [Defect ID 63882]
- The E Series router does not log a warning when it receives an IGMPv2 query but is not configured to use IGMPv2 on the interface. [Defect ID 46046]
- IGMPv3 proxy is not supported. [Defect ID 46038]

IP

- The ES2 4G LM can reset during a unified ISSU after you issue the **issu start** command on a router configured with 8000 dynamic VCs and 8000 packet-triggered dynamic subscriber interfaces. [Defect ID 86761]
- If you have a large configuration on a hybrid module combination (OC3/STM-1 GE/FE line module with the OC3-2 GE APS I/O module), boot from NVS, and issue the **slot erase** command before booting has completed, the line module resets. [Defect ID 64104]

  Work-around: To recover from the error, issue the **slot reload** command anytime after the module begins to reset.
- When a router configured with PIM on a virtual router undergoes multiple warm restarts, the router subsequently hangs when an IP profile is configured. [Defect ID 176470]
- Deleting a VRF with 32,000 static subscriber interfaces fails to complete. [Defect ID 82670]

  Work-around: Use a macro to delete all static subscriber interfaces before you delete a VRF.
- The **ip route permanent** command does not work properly. [Defect ID 34303]

  Work-around: Issue the **ip alwaysup** command to prevent the route from being removed from the IP routing table after the interface is shut down.
- Traffic statistics for dynamic subscriber interfaces associated with Mobile IP subscribers are not maintained as the subscribers move between Mobile IP nodes. Consequently the reported interface statistics are only the values accumulated since the last time a mobile node moved. [Defect ID 174509]
- When you change the demultiplexer type on a primary interface that has 1024 demultiplexer table entries, the ICC ping threshold times out due to the removal of the old entries and the addition of the new ones. [Defect ID 182218]
- After an SRP stateful switchover completes on an ERX1410 router configured with a single VPN routing and forwarding instance (VRF) and Network Address Translation (NAT), the SRP module that becomes active after the switchover resets. [Defect ID 180058]

- If you enable detection of duplicate IPv6 prefixes using the **aaa duplicate-prefix-check** command, and bring up a subscriber in a dual-stack network (in which both IPv4 and IPv6 subscribers are present) over a static PPP interface for which IPv6 prefix is configured for IPv6 Neighbor Discovery router advertisements (using the **ipv6 nd prefix-advertisement ipv6Prefix** command), the subscriber session is successfully brought up. When you attempt to bring up another subscriber over a different interface on the same virtual router as the one used for the first subscriber, and for which the Ipv6-NdRa-Prefix (VSA 26-129) returned from the RADIUS server in the Access-Accept message is the same IPv6 prefix as the statically configured value for the first subscriber, the second subscriber session is also brought up and not disconnected as expected.

  In such a scenario, the duplicate IPv6 prefix detection functionality does not cause the second subscriber session, which uses the same IPv6 prefix as the first subscriber session, to be rejected. Also, a new IPv6 route is installed for the second subscriber as a duplicate access-internal route. [Defect ID 187264]

IPSec

- IPSec tunnels created over Fast Ethernet interfaces fail to come up. [Defect ID 179256]

  Work-around: After you create the tunnel, bounce the tunnel interface by issuing the **shutdown/no shutdown** command sequence. The tunnel comes up successfully.

- In a network where you use the **tunnel signalling** command to specify that the security parameters and keys are configured manually for IPSec tunnels between VRs, the line modules reset when you delete and then re-create the IPSec tunnels. If you attempt to configure the tunnels again after the modules come back up, the line modules reset again.

  Work-around: Configure the IPSec tunnels to use ISASKMP/IKE to negotiate SA and establish keys. [Defect ID 178304]

IS-IS

- On a router configured with IS-IS and BFD, using the **redundancy force srp** command to force an SRP switchover sometimes brings down IS-IS and BFD. [Defect ID 179287]
- IS-IS graceful restart (nonstop forwarding) does not work on the broadcast interface when the restarting router is the designated intermediate system (DIS). Graceful restart works properly when the restarting router is not the DIS. [Defect ID 61496]
- When you configure the metric-style as wide for two routers connected in an IS-IS domain using the **metric-style wide** command in Router Configuration mode, both the routers learn the routes of each other correctly by generating and accepting only new-style TLVs with wider metric fields. When you change the metric-style from wide to narrow using the **metric-style narrow** command to enable the routers to accept only old-style TLVs with a narrow (six-bit) metric field, the routing table is not properly updated and the neighboring routers do not purge the previously learned routes to accept narrow metric fields. The routers continue to use the wider metric fields in the routing tables. [Defect ID 187607]

L2TP

- When you perform a stateful SRP switchover procedure on an LNS device that contains an ES2 4G LM with Service IOA (tunnel server module), some of the 16,000 subscriber sessions over 16,000 tunnels that are established are terminated. This problem occurs when OSPF is used as the routing protocol between the LAC and LNS devices in the L2TP tunnel, and with the number of L2TP retransmission attempts configured as 10. [Defect ID 187358]
- L2TP subscriber sessions that were previously established are disconnected when you perform a stateful SRP switchover operation in a scaled environment. [Defect ID 187454]
- If you create an L2TP destination profile *profileName*, establish tunnels with the profile, and then remove the profile, you cannot subsequently create another destination profile using that same *profileName* until all the tunnels drain from the previous instance of this destination profile. If you do not wait, the E Series router displays a message similar to the following:

  l2tp: Discarding incoming sccrq from vr default, remote address 192.168.100.1 - no destination profile.

  If you do not want to wait for the tunnels to drain, use a different name for the destination profile.
- After a unified ISSU completes on a router functioning as an L2TP access concentrator (LAC), traffic outages occur on the L2TP network server (LNS)-facing interface at the LAC in a configuration with 16,000 or 32,000 L2TP sessions over 500 tunnels. [Defect ID 180147]
- If you perform a unified ISSU operation on an E120 router or an E320 router that contains two pairs of line modules configured for stateful line module switchover and functions as an LNS device, the SRP module resets during the unified ISSU process. This problem occurs when any one of the following conditions are met: [Defect ID 186910]
  - A certain number of L2TP subscribers are already connected to the router and more subscriber sessions are attempted to be established during the unified ISSU process.
  - The logged-in L2TP subscribers are logged out and the subscriber sessions are attempted to be reestablished.
  - After the initialization phase of the unified ISSU process is started and completed, a stateful line module switchover is performed and another unified ISSU process is performed while more subscribers are logging in.
- On a router configured as an LNS device with two pairs of line modules for high availability and L2TP subscriber sessions, after you perform a stateful line module switchover in one of the pairs, the secondary line module that takes over the role of the primary after the switchover process (ES2 4G LM with Service IOA) might reset. This problem occurs intermittently when subscribers are logging out or are being disconnected.

LDP

- Some of the LDP sessions on ATM line modules do not come up when you perform a unified ISSU operation on an ERX router, which is the restarting router, from JunosE Release 10.3.3 to Release 11.0.3. This problem occurs when an ERX router functions as the restarting router and an E120 or E320 router functions as the helper router. [Defect ID 189588].

MLD

- MLDv2 proxy is not supported. [Defect ID 46038]
- The E Series router MLDv2 proxy does not operate correctly in the presence of MLDv1 queriers. [Defect ID 46039/46045]

  Work-around: If an MLDv1 router is present on the network, configure version 1 with the **ipv6 mld-proxy version** command on that network interface. (Version 2 is the default.)
- The default value for the MLDv2 proxy unsolicited report interval timer should be 1 second rather than 10 seconds (the value for v1). [Defect ID 46040]
- The E Series router does not log a warning when it receives an MLDv1 query but is not configured to use MLDv1 on the interface. [Defect ID 46046]

MLPPP

- Failure to meet all of the following conditions for fragmented packets can result in an incorrect operation during packet classification of the resulting reassembled packet: [Defect ID 50111]
  - The initial fragment of a packet must either contain the entire MLPPP packet or be greater than 128 bytes.
  - The fragment size of the peer must not be lower than 128 bytes.
  - The initial fragment of a packet must be larger than subsequent fragments of that packet.

Mobile IP

- The setup rate for Mobile IP client sessions decreases when you repeatedly bring a large number of sessions down and back up. [Defect ID 178760]
- The @*realm* variable and the **@** keyword alone do not work for the **show ip mobile binding** command. [Defect ID 178653]

  Work-around: You can use the *user*@*realm* syntax instead to display the binding for a specific user, as in this example:

```
host1#show ip mobile binding nai xyz@example.com
```

  Alternatively, you can display the entire Mobile IP binding table by issuing the **show ip mobile binding** command without additional options.
- When mobility bindings are present and you delete the Mobile IP home agent with the **no virtual router** command, Mobile IP sends a RADIUS Acct-Stop message with no accounting statistics for the subscribers. [Defect ID 179081]

  Work-around: Issue the **clear ip mobile binding all** command before you issue the **no virtual router** command. The **clear** command clears all the MIP subscribers and sends a RADIUS Acct-Stop message with the appropriate accounting statistics for the subscribers.

- The **clear ip mobile binding nai** @*realm* command does not work. [Defect ID 178652]

  Work-around: Use the following version of the command instead:

  clear ip mobile binding nai *user@realm*

MPLS

- When MPLS and IS-IS are configured on Ethernet interfaces, you cannot delete the interface after the IP address is removed. This issue is not a problem on Ethernet VLAN interfaces. [Defect ID 66813]

  Work-around: Issue the **no mpls** command to disable MPLS, then delete the interface.

- If LSPs are announced into IS-IS, then the IS-IS routes cannot be used for multicast RPF checks, because LSPs are unidirectional. [Defect ID 28526]

  Work-around: Configure static RPF routes with native hops when LSPs are autoroute announced to IGPs.

- When the IPv4 explicit null label appears anywhere other than at the bottom of the label stack, TTL expiration for this label is not handled correctly. As a result, the **traceroute** command does not work correctly for LSPs that have the IPv4 explicit null label anywhere other than at the bottom of the label stack. [Defect ID 76037]

- When you issue a **traceroute** or **trace mpls** command to trace the paths of router packets over MPLS interfaces on an ES2 10G LM or ES2 10G Uplink LM, the results include an extra unknown host. [Defect ID 174537]

- In a scaled environment with a large number of MPLS RSVP-TE tunnels configured, the states of the hello adjacency instances in the State field in the output of the **show mpls rsvp hello instance** command are displayed as Down for loopback interfaces. The correct behavior is that the RSVP-TE hello adjacencies must always be in the Up state for loopback interfaces. [Defect ID 189565]

Multicast

- When you configure more than 10,219 outgoing interfaces (OIFs) on the same ES2 10G LM in a single multicast group, the configuration of the multicast group's OIF membership from the SRP module to the line module exceeds the size of a single message and is sent in fragments.

  Because of this fragmentation, the ES2 10G LM generates the following error message: [Defect ID 81768]

  pc: 0x9e5c88: -> fatalPanic(void) offset: 0x8

Netflow

- The OC3/STM1 GE/FE line module might reset after sending Ethernet traffic into a VPLS network in a test environment when Ethernet packets are flooded to remote VPLS bridges. [Defect ID 74540]

- Flow sampling stops after a cold switchover on a router that is configured with 16 VRs and 32 interfaces per VR, when all flows are passing through the configuration (32 flows per VR). [Defect ID 74477]

  Work-around: After the cold switchover is completed, reissue the **ip flow-sampling-mode packet-interval 10** command on each VR, even though the command is present in the configuration.

OSPF

- When PPPoE clients are connected to a router that functions as a LAC on one side of an L2TP tunnel and another router operates as an LNS device on the other side of the tunnel, OSPF graceful restart abruptly terminates at the helper router (which is the LAC device) and a traffic outage occurs. This problem occurs only when the following conditions are met:
  - If you perform a unified ISSU process on the LNS (which is the restarting router)
  - If you configure OSPF as the routing protocol and OSPF graceful restart behavior is configured on both the routers.

  In such a case, during the unified ISSU operation, after the upgrade phase (stateful SRP switchover) is completed at the LNS device, the LAC device stops the graceful restart and the adjacency with LNS goes down. This brief disruption in user data traffic happens if both the unified ISSU and OSPF graceful restart processes take a longer duration than the configured OSPF dead interval and OSPF graceful restart time.

  To avoid this problem of adjacencies between the restarting router and the helper router from being reset, we recommend that you increase the dead interval and graceful restart timer values for the OSPF protocol to appropriate values, based on the level of complexity of the network and configuration settings, to enable OSPF graceful restart to be completed successfully. For example, in certain environments, you need to increase both the OSPF graceful restart timer (by using the **graceful-restart restart-time** command in Router Configuration mode) and the OSPF dead interval (by using the **ip ospf dead-interval** command in Interface Configuration mode) values to 300 seconds for graceful restart to complete correctly. [Defect ID 188341]

Policy Management

- On the E320 router, redirecting a large configuration with thousands of interfaces to a script file can take a long time, perhaps exceeding a half-hour depending on the configuration. [Defect ID 80429]
- If you have removed the last rule in a policy list, the router generates a warning only after you exit Policy List Configuration mode. If you have removed the last policy rule and then added a classifier group before you exit Policy List Configuration mode, the router does not generate a warning about removing the last rule. [Defect ID 83834]
- When an MD-Port-Number value greater than 65,535 is sent to an E120 or E320 router by means of a COA request, the value that is displayed in the UDP header of mirrored packets is the actual value minus 65,536. For example, an MD-Port-Number of 65,540 is displayed in the mirrored packet as 4. [Defect ID 84712]
- On the E120 and E320 routers, when a mirror rule is deleted after a CoA request is sent with Juniper-LI-Action set to No-Action, the existing mirroring session is not disabled. [Defect ID 84826]

- When you reload the slot holding a GE-2 or GE-HDE line module and you have configured more than about 2000 policies with rate limiting on that module, the drop count becomes more than expected. This unexpected drop count does not occur when you create the same configuration after you reload the router to the factory-default configuration. [Defect ID 175696]
- On E320 line modules that support secure policies, the SRP module enables you to configure more than 1022 secure policies per module. [Defect ID 175756]

  Work-around: To avoid potential performance issues, we recommend that you do not configure more than 1022 secure policies per module.
- When you modify a rate-limit profile in Global Configuration mode after the system is in a scaled state, changes to the rate-limit profile fail owing to lack of adequate policy resources. However, the changed value of the rate-limit profile is displayed in the output of the **show rate-limit profile** command. [Defect ID 79342]

  Work-around: To avoid this problem, do not update the rate-limit profile in Global Configuration mode in a scaled environment.
- When you enter the **no ip policy-parameter hierarchical** *parameterName* command or **no ipv6 policy-parameter hierarchical** *parameterName* command for a hierarchical policy-parameter type in Interface Configuration mode, the explicit reference of the parameter is removed successfully from the interface. However, the Referenced by interfaces field in the output of the **show policy-parameter** command does not change from the previously configured value to implicit. [Defect ID 183957]

  Work-around: To correct this problem, remove the entire interface configuration.
- Unified in-service software upgrade (unified ISSU) is not supported on an E120 or E320 router if a hierarchical policy is attached to an external parent group. [Defect ID 177478]

PPP

- When line high availability is configured on a router, the following errors appear with statistical information: [Defect ID 187885]
  - The **show ppp interface full** command output displays erroneous values, mainly for the fields under the Authentication Statistics section, which alternate between 0 and n for each instance of the entry of this command to display accumulated counters since the session was established.
  - The values returned in the Interim-Acct messages are incorrect and inconsistent, which causes wrong values to be displayed for the relevant accounting-related attributes in the radiusSendAttributes event log. The recorded values do not depict the accurate statistics sent across the PPP subscriber interface.

  These problems do not occur when stateful line module switchover is not configured on the router.
- On a pair of line modules configured for redundancy, if you disable the primary module in the redundancy group, previously established L2TP sessions are not reconnected. This problem occurs with PPP over ATM interfaces and 16,000 L2TP subscriber sessions. However, this problem does not occur with static and dynamic PPPoE over ATM subinterfaces. [Defect ID 187085]

PPPoE

- The E Series router erroneously accepts a PADI with a payload length of 0 instead of rejecting it and incrementing the PPPoE Invalid PAD packet length counter. [Defect ID 48356]

QoS

- You cannot paste a **load-rebalance** command string that uses the **percent** option into a console or Telnet session from **show configuration** output because the output displays the % sign rather than the **percent** keyword that was submitted with the command and the percent sign is not recognized by the CLI. [Defect ID 81705]
- The compound shared shaping feature does not work properly on egress forwarding ASIC 2 (EFA2)-based ATM line modules when the shared shaper is queue-controlled as opposed to node-controlled. In a node-controlled configuration, in which you configure the shared-shaping rate on the best-effort scheduler node for the logical interface, integration of the EFA2 and ATM segmentation and reassembly (SAR) schedulers functions properly. However, in a queue-controlled configuration, in which you configure the shared-shaping rate on the best-effort queue for the logical interface, integration of the EFA2 and ATM SAR schedulers does not function properly. [Defect ID 69167]

  Work-around: Use node-controlled compound shared shaping configured on the best-effort scheduler node with EFA2-based ATM line modules.
- The CLI erroneously enables you to configure a QoS profile with the **ethernet node group** command. [Defect ID 80861]
- The dynamic shaping rate calculated by the simple shared shaper can vary because of the variation in the enqueue rate of the constituent queues. Even when the offered load is constant, the mechanism that calculates the enqueue rate introduces a slight variation, introducing a slight variation in the calculated dynamic shaping rate. [Defect ID 80938]
- On a router that has both an ES2 10G LM and an ES2 4G LM installed, the byte count reported by the **show fabric-queue egress-slot** command is incorrect. The reported packet count is correct. [Defect ID 80965]
- When QoS resources such as failure nodes and statistics bins are exhausted because of insufficient memory available on the line module, the failures are properly logged, but additional log messages are generated every 10 minutes that report zero failures. [Defect ID 85105]
- The **no qos-parameter-define definition** command does not delete the specified QoS parameter definition. [Defect ID 176844]

  Work-around: Remove the interface and add the desired QoS parameters when you re-create the interface instead of deleting the definition.
- Simple shared shaping does not function correctly when it is used for 32,000 subscribers on an ES2 10G ADV LM. However, when you change the shaper to compound shared shaping, it works properly. Also, simple shared shaping does not function correctly for 16,000 subscribers on an ES2 10G ADV LM. [Defect ID 183512]

- When 32,000 subscribers with 128,000 QoS queues are brought up on an ES2 10G or ES2 10G ADV LM, the LM resets if you modify the QoS profile that contains the best-effort IP or VLAN node rule, which references a scheduler profile configured with shared shaping rate, to a scheduler profile configured with legacy shaping rate. [Defect ID 183291]

  Work-around: To avoid this problem, apply shared shaping on the best-effort queue, instead of on the best-effort node.

- When you configure an E120 or E320 router with an ES2 10G ADV LM as a LAC on one side of an L2TP tunnel and as a LNS to receive packets from the LAC on the other side of the tunnel, use RADIUS servers for authentication of subscribers on both sides of the tunnel, and attempt to bring up 16,000 subscribers on the L2TP tunnel, the LM that has subscribers on the LAC side of the tunnel resets when approximately 8000 logged-in subscribers are logged out and try to reestablish the connection. [Defect ID 184118]

- Only the headings for S-VLAN aggregate statistics are contained in the bulk statistics (.sts) file that collects QoS statistics on egress queues for various interface types. The corresponding aggregate statistics are not displayed in the corresponding data fields. This problem occurs only when the manual method of data transfer from the router to the receivers is employed by using the **manual-xfer** keyword with the **bulkstats collector collect-mode** command. This behavior is not observed when the automated collection method is configured using the **auto** keyword with the **bulkstats collector collect-mode** command for the agent to transfer the bulk statistics file to the host when the interval for which the collector transfers data from the router to the receivers expires. [Defect ID 187592]

RSVP-TE

- After stateful SRP switchover, forwarding of VPN traffic might not resume if the core interface that carries an MPLS base tunnel with LDP over RSVP-TE flaps (constantly goes up and down). [Defect ID 182019]

- When you enter the **show mpls rsvp sessions** command to display RSVP-TE session information, the telnet session stops responding. The telnet session cannot be cleared and the SRP utilization reaches 100 percent in such a scenario. [Defect ID 91294]

Server Card Manager (SCM)

- High availability mode transitions to the pending state when you perform the following steps. The high availability state of the system is displayed in the output of the **show redundancy detail** command.

  1. Configure a shared tunnel-server port on an ES2 4G line module that functions as the primary in a redundancy group of line modules.
  2. Bring up a GRE tunnel on the primary line module.
  3. Perform a line module redundancy operation to switch over from the currently active primary to the standby module.

  When the system is in the pending state, the SCM application running on the router becomes unsupported for 5 minutes, and then it returns to the active state. The client field in the output of the **show redundancy clients** command displays the status of the SCM application. [Defect ID 188489]

Service Manager

- After you activate an independent IPv6 service and issue either of the following commands on the default virtual router or any other virtual router, except the one on which the subscriber session is active, no output is displayed in the CLI interface: [Defect ID 181929]
  - **show service-management subscriber-session** *subscriberName* **interface** *interfaceType interfaceSpecifier*
  - **show service-management subscriber-session** *subscriberName* **interface** *interfaceType interfaceSpecifier* **service-session** *serviceName*

  This problem also occurs when a subscriber is authenticated using a RADIUS server for a combined IPv4 and IPv6 service in a dual stack.

  Work-around: To avoid this problem, use the **show service-management owner-session** *ownerName ownerId* command to display subscriber session information based on the session owner, instead of the **show service-management subscriber-session** *subscriberName* **interface** *interfaceType* command to display details on subscriber sessions.

SONET

- You cannot use the highest sensitivity bit-error rate setting (a value of 9) associated with APS/MSP alarm when you issue the **threshold sd-ber** command to configure a cOCx/STMx line module with cOC12-APS-capable IOAs. [Defect ID 72861]

  Work-around: Use only a value in the range 5–8 when you issue the **threshold sd-ber** command for this module combination, as in the following example:

```
host1(config)#controller sonet 2/1
host1(config-controll)#aps group boston
host1(config-controll)#aps protect
host1(config-controll)#threshold sd-ber 6
```

SRC Software and SDX Software

- When multiple IPv6 interfaces are configured with policies attached from SRC, only some of the IPv6 interfaces have the policies attached. [Defect ID 179498]
- Changing the SSCC status (enable/disable) while IPv6 interfaces are configured might cause the SRP to reset. [Defect ID 179537]

Stateful SRP Switchover (High Availability) and IP Tunnels

- A packet loss sometimes occurs during stateful SRP switchover when you use the **ping** command on a router that is configured for OSPF graceful restart, and is connected to a helper router in the OSPF IPv6 broadcast network and another helper router in the OSPF IPv6 backbone area. [Defect ID 181470]
  - ERX7xx model, ERX14xx model, or ERX310 router:
    - When you use the **ping** command with the IPv6 address of the helper router in the multicast area as the destination address and the loopback address of the helper router in the backbone area as the source address, a packet loss of 2 seconds occurs for the first stateful SRP switchover. However, no packet loss occurs for successive stateful SRP switchovers.

        - When you use the **ping** command with the IPv6 address of the helper router in the broadcast network as the destination address and no source address when stateful SRP switchover is performed the first time, an identical packet loss occurs. In this case too, no packet loss occurs during subsequent switchovers.
    - E120 router or E320 router
        - When you use the **ping** command with the IPv6 address of the helper router in the broadcast network as the destination address and the loopback address of the helper router in the backbone area as the source address, no packet loss occurs.
        - When you use the **ping** command with the IPv6 address of the helper router in the multicast area as the destination address and no source address, a packet loss of 1–2 seconds sometimes occurs during stateful SRP switchovers.

- When you perform a stateful line module switchover on E120 and E320 routers with an SRP-320 module that is configured with two high availability pairs of line modules, when subscriber sessions are being established, one of the LMs (ES2 4G LM with Service IOA) that functions as the secondary module takes over the role of the primary and reaches the online state. However, the newly configured primary LM resets shortly after it is online and a core dump file is generated. [Defect ID 187860]
- After you configure a high availability pair of line modules on a router, if you administratively disable the slot that is in an online state in which the primary line module resides by entering the **slot disable** command, the secondary line module takes over by recovering all the applications running on the primary module to a stable state and the slot in which the primary module resides transitions to the disabled (admin) state. If you disable the newly configured online line module in the high availability pair and enable the slot in which the original standby line module resided, it remains in the initializing state. [Defect ID 186211]
- On E120 and E320 routers configured with an SRP module that contain a high availability pair of line modules, the primary SRP module intermittently resets when you perform a stateful SRP switchover after a stateful line module switchover is completed. This problem occurs only when login and logout of subscribers is in progress during the stateful line module switchover. [Defect ID 187444/186836]

Subscriber Management

- When a dynamic GRE tunnel interface for Mobile IP relocates between SM modules because the original SM reloads, Mobile IP deletes the relocated tunnel interface. [Defect ID 178399]
- Dynamic subscriber interfaces continue to remain in the down or not present operational state in either of the following scenarios: [Defect ID 81269]
    - If you configured a dynamic interface column, such as a dynamic bridged Ethernet interface, dynamic VLAN interface, or an ATM interface, and when any one of the following conditions is satisfied:
        - The major interface is bounced (shut down and reenabled)
        - The major interface is shut down, which cause the dynamic VLAN interfaces to be removed

    - The physical link goes down and comes back up
    - The line module is removed and reinserted
  - If you configured a static interface column and removed the major interface

  These scenarios might occur if you administratively issue the **shutdown** and **no shutdown** commands on the major interface in which the dynamic interface column is configured.

  Work-around: Use the **no interface ip** *ipAddress* command to remove the dynamic subscriber interfaces. Although you can use the **dhcp delete-binding** command to remove the DHCP binding and the dynamic subscriber interfaces, the DHCP client does not detect the binding removal and retains the lease.

- When a subscriber has subscribed for a service, service session accounting records always contains a default Acct-Terminate-Cause value of 10. This value remains unchanged even after you use the **terminate-code** command to configure a custom mapping between application terminate reasons and RADIUS Acct-Terminate-Cause attributes. [Defect ID 181043]

System

- Beginning with JunosE Release 11.0.0, the FPGA upgrade feature has been enhanced to reduce the booting time of the system. The FPGA upgrade operation takes place only if a system requirement, such as a cyclic redundancy check (CRC) mismatch, occurs. On E120 and E320 routers, if you upgrade the system from a release that supports the enhanced FPGA upgrade (such as 11.0.3), downgrade the system to a release numbered lower than 11.0.0 that does not contain the enhanced the FPGA upgrade mechanism (for example, 9.0.1p0-7-5-2 or 10.2.1p0-2), and then upgrade the router again to a release that supports the enhanced FPGA upgrade mechanism, the SRP-100 or SRP-320 modules might not upgrade the FPGA correctly. [Defect ID 190012]

  In JunosE Release 12.0.1, the SRP module that has an FPGA revision number that is different from 0xbd26 denotes this problem. This error can occur with both unified ISSU or cold upgrade operations. However, this condition does not occur when the SRP module is reset after being powered off and turned on, or when the SRP module is unplugged and reinserted into the same slot.

- Memory leak is observed with the SRP-100 module while subscribers are being brought up on a LAC device and the active link between the LAC device and the LNS device in an L2TP tunnel is flapping. This problem occurs when the following steps are performed: [Defect ID 189353]

  1. Two redundant links connect the LAC device to the LNS device in the L2TP tunnel.
  2. DHCPv6 subscribers over PPPoE interfaces connected to a LAC device are attempted to be brought up.
  3. The active link between the LAC and LNS devices flaps continuously 1000 times using the **shutdown** and **no shutdown** commands.
  4. Memory-related output information is collected at a base condition where the active link is up again and no subscriber is connected to the router.

  When you perform each iteration of the preceding four steps, the amount of free memory on the SRP-100 module decreases and validates a memory leak.

- You cannot use a configuration script to boot the E320 router. [Defect ID 80304]
- If you hot swap an IOA and then remove it again before that IOA's OK or FAIL LED is illuminated, the associated line module can reset. [Defect ID 177313/177267]

  Work-around: Ensure that you firmly insert the IOA into the chassis when you hot swap IOAs. Do not attempt a second hot swap of an IOA that has not indicated that it completed the first hot swap cycle. You can remove the IOA when either its OK or FAIL LED is illuminated.
- If your router is in Manual Commit mode, then you must issue the **write memory** command before you perform an SRP module switch or a manual reload. You must do this even when you have made no changes to the system configuration and the file systems are synchronized. [Defect ID 44469]

TCP

- The SRP module resets in any of the following circumstances on an E320 router that has a line module configured with 5000 ANCP adjacencies: [Defect ID 176916]
  - When you issue the **issu initialization** command from the console and then reload the line module from a Telnet session.
  - When the client that has the 5000 ANCP clients resets or an intermediate switch resets.
  - When you reload the line module.

Unified ISSU

- When you perform a unified ISSU operation after link flaps in a network from JunosE Release 10.3.3 to Release 11.2.x on a router that contains ES2 4G LMs and is configured with MPLS applications (L3VPNs, L2VPNs, and VPLS), all the ES2 4G LMs reset after the upgrade is completed. [Defect ID 189178]
- Unified ISSU is not supported with 8000 bridged Ethernet interfaces on an OC3/STM1 GE/FE ATM line module. [Defect ID 178811/178797/ 179547]
- ATM line modules might reset after a unified ISSU when you attempt to add memory to a VLAN subinterface in a large bridged Ethernet configuration. [Defect ID 178798]
- Under certain conditions, a unified ISSU from JunosE Release 9.2.0p1-0 to the current release fails, and causes the SRP module and the ES2 4G LM to reset. [Defect ID 179975]
- During the unified ISSU operation, if you modify the router configuration after the initialization phase of the process is completed and before you issue the **issu start** command to commence the upgrade phase of the unified ISSU process, the unified ISSU procedure completes successfully and the stateful SRP switchover process begins to synchronize between the active and standby SRP modules. When the synchronization process is in progress, the standby SRP module reloads for the second time. After the second reload of the standby SRP module ends, the synchronization process also ends properly.

  Although the standby SRP module reloads for the second time when it is synchronized with the upgraded release, normal router operations, such as handling of subscriber sessions and forwarding of traffic, remain unaffected. [Defect ID 185517]

- When any of the subsystems is excluded for a JunosE release, a unified ISSU to that release fails to apply conversion code to all of the line modules. As a result, the line modules reset when they come up with that release. [Defect ID 179595]

  Work-around: To prevent the exclusion of a subsystem file from the release, do the following before you upgrade to a new JunosE release that supports unified ISSU:

  1. Issue the **show subsystems file** *fileName*.**rel** command, where *fileName* is the name of the software release file, to determine whether any of the subsystem files are excluded from the release.
  2. For each subsystem file that is excluded, issue the **no exclude-subsystem** *subsystemName* command to remove the exclusion for the specified subsystem file.

  If you copied the software release to the router before removing the subsystem file from the exclusion list, you must copy the release to the router again to ensure that all subsystem files are included in the release.

Resolved Known Problems

The following problems were reported open in Release 12.0.0 and have been resolved in this release, or have been resolved since the 12.0.0 FRS release. For more information about particular resolved problems, you can log in to the JunosE Knowledge Base at https://www2.juniper.net/kb/, enter the defect ID number in the Search by Keyword field, and click Search.

Release 12.0.1 is based on the 12.0.0 FRS release and incorporates all problem resolutions found in that release. For information about resolved problems in a patch release, customers with valid service agreements may log in to the JunosE Download Software page on the Customer Support Center Web site at https://www.juniper.net/support/csc/swdist-erx/. Select the Patch Release History for the JunosE release you are interested in.

ARP

- Enabling L2TP tunnel selection failover within a preference level does not work properly. For example, when the **l2tp fail-over-within-preference** command to enable the router to select a new destination within the same preference level and the **l2tp retransmission 2** command to specify the retransmission attempts are used, two retransmission attempts to the two server endpoint destinations configured with the same preference with one subscriber login or authentication attempt are not always observed. [Defect ID 91343]

BFD

- With BFD configured (using the **isis bfd liveliness-detection** command) on the interface of an ES2 10G LM, the LM resets when it receives a message from the SRP module for deletion of BFD sessions. [Defect ID 89740]

BGP

- The Description field in the output of the **show bgp ipv6 neighbors** command displays incorrect link-local addresses. [Defect ID 91312]

CLI

- The standby SRP module that takes over as the newly active primary module resets. [Defect ID 91391]

DHCP

- When the delegated prefix is unavailable, the ERX router fails to send the Advertise message with the status code as NoPrefixAvail. [Defect ID 91179]
- An E320 router that receives illegal DHCPv6 rebind messages replies with the status code as success. [Defect ID 91359]

DHCP External Server

- Active SRP module resets with a stack trace due to a stale entry present in the DHCP external table. [Defect ID 91144]
- The DHCP external server deletes an existing client binding if the client requests a fresh IP address before the existing lease expires. [Defect ID 91600]
- In an environment in which DHCP subscribers are logged in to a non-default virtual router, with DHCP relay, DHCP proxy server, and dynamic subscriber interfaces configured, the SRP module might reset. [Defect ID 91607]
- DHCP external bindings are cleared while processing DHCP decline packets from a different MAC address. [Defect ID 91608]

Ethernet

- LAG interfaces transition to the Up state before the LACP status (mux state) is collecting or distributing [Defect ID 89641]
- ES2 10G LMs reset with Ethernet VLAN bulk configuration. [Defect ID 90901]
- The VLAN advisory receive (Rx) speed and the VLAN advisory connect (Tx) speed settings are removed from the VLAN subinterfaces after an upgrade. [Defect ID 91231]
- Dynamic VLAN subinterfaces are not created. This problem is seen in a BRAS environment with PPPoE, bulk VLAN configuration, and Agent Circuit Idnetifier (ACI) settings. [Defect ID 91377]
- The ARP entry is not removed when the interface associated with it is deleted. [Defect ID 91425]
- VLAN interface counter does not match with the bulkstats counter if it is over 32 bits. [Defect ID 91462]

Forwarding

- Multiple line modules on a particular chassis experienced intermittent resets. This problem because of a slot sending erroneous packets, which are recirculated to the ingress forwarding controller (FC). The ingress FC transmits this packet to the FFA ASIC and results in invalid enqueue problems. [Defect ID 90730]
- The Equal Cost Multipath (ECMP) egress traffic on ES2 10G LMs is not load-balanced properly on all links when the ingress LM is also an ES2 10G LM. [Defect ID 90005]
- L2TP sessions do not come up after enabling L2TP over MPLS tunnels if the network between LAC and LNS uses IP. [Defect ID 186944]

- Forwarding of traffic on ES2 10G Uplink LMs stops after a stateful switchover operation is performed and the **shutdown/no shutdown** command sequence is entered on the core side. [Defect ID 91070]
- The Equal Cost Multipath (EMP) paths do not work for EBGP and IBGP sessions as expected after entering the maximum-paths eibgp command under the IPv4 address family. [Defect ID 91100]
- On an ERX or E320 router that functions as the last-hop provider core router in a circuit where it is connected to provider edge (PE) routers, load-balancing does not occur correctly over a LAG bundle with two member-links. [Defect ID 91135]
- MLPPP sessions do not work properly if fragmentation on an MLPPP link interface is configured using the ppp fragmentation command. This problem does not occur if PPP fragmentation is not configured. [Defect ID 91184]
- When IPv4 and IPv6 addresses are configured on two different virtual routers, removal of the IPv6 address on a 10-Gigabit Ethernet interface on an ES2 10G Uplink LM causes the ARP application to not work properly and traffic forwarding to be disrupted. This problem does not occur with Gigabit Ethernet interfaces. [Defect ID 91431]

Hardware

- After a reload of the E320 router, traffic is not forwarded towards the MPLS core using the 10-Gigabit Ethernet interface on ES2 10G LMs. The interface on the module comes up and the output of the **show version** and **show hardware** commands do not denote any problems. However, the address of the interface on the other side of the link cannot be pinged. LDP and OSPF sessions do not come up on the ES2 10G LM link. [Defect ID 91457]
- When a power cycle of an E320 router is performed, a static RAM (SRAM) parity error occurs on an ES2 10G Uplink LM. [Defect ID 91444]
- SA validation is not skipping IPV6 DHCP control packets on LM10A. [Defect ID 91438]
- REV-02 ES2 10G LM reset type Control Bus Reset. [Defect ID 91171]
- Recovery mechanism for content addressable memory (CAM) interface errors is available on ES2 10G LMs. [Defect ID 187086]
- An SRA 8 is observed on ES2 10G LMs when the ES2 4G LM that shares the multicast traffic is reloaded. [Defect ID 187463]

IGMP

- Using the **ip block-multicast-sources** command to block all multicast traffic with a scope larger than link-local (for example, global) on ES2 4G LMs prevents the router from receiving IGMP group membership reports from hosts [Defect ID 90149]

IP

- Only one MTU changes in an IPv6/IPv4 dual stack. IPv6 MTU cannot be adjusted automatically according to the physical MTU. [Defect ID 91245]
- When a new static ARP entry is added after removing the ARP entry and the interface, the SRP resets at times. [Defect ID 90483]
- A line module reboots when the PPP application requests a change of state of the interface from the down state to the up state. [Defect ID 90926]

- When three ICMPv6 packets are received with time-to-live exceeded, the router does not respond. [Defect ID 91225]
- In a BRAS environment, PPP subscribers failed to log in successfully when stale IP interfaces are found. [Defect ID 90994]
- System logging initialization with an unexpected UID value in the routerId.cfg file causes an indefinite system outage. [Defect ID 91528]

IPv6

- All the configuration settings on IPv6 interfaces are lost when a reload is performed. This problem occurs when different unnumbered loopback interfaces are configured for IPv4 and IPv6 protocols. This problem does not happen when the same unnumbered loopback interface is configured for both IPv4 and IPv6. [Defect ID 91662]

IS-IS

- LDP IGP synchronization encounters an error for multipath links. [Defect ID 90887]
- The SRP module on an E320 router, with HA enabled and active, resets. This problem occurs when the router is a BRAS termination point that is running MPLS, LDP, BGP and ISIS. The ISIS configuration consists of two uplinks that are set to be L2 interfaces. [Defect ID 91394]

L2TP

- A reset of the cOC3 and cOC12 line modules might be observed after a software upgrade, even though L2TP is not supported on these module combinations. [Defect ID 91042]

MGTM

- Mroutes are missing, although the reporters are available and new subscribers are not able to request the stream. [Defect ID 90966]

MPLS

- ES2 10G Uplink LM undergoes repeated resets after enabling MPLS on its interfaces. [Defect ID 91299]
- Stale MPLS shim interface entries are present in the NVS. [Defect ID 91178]

Multicast

- Mroutes are incorrectly pointing to the null outgoing interface when subscribers log out. [Defect ID 90965]
- Multicast traffic loop after uplink flaps occur. [Defect ID 91358]

OSPF

- Routing table is not correctly updated when link-local address is used as forwarding address in AS external-LSA. [Defect ID 91288]
- When you enable logging of IPv6 and OSPF events for the debug severity level, the debug logs for IPv6 events are not generated. [Defect ID 91296]

Policy Management

- RADIUS request messages for ingress and egress policy attachment fails on IPv4 interfaces when a subscriber sends a dual-stack request for both IPv4 and IPv6 interfaces. RADIUS requests work properly when ingress and egress policies are attached to IPv4 interfaces for subscribers that are connected only using IPv4. [Defect ID 91506]
- ES2 10G ADV LM reset, file: aptationLayer.cc, line: 8230, task: scheduler on a card installed with an ES2-S1 Service IOA acting as an LNS. The reset was seen when PPP and L2TP subscribers were being brought up or when subscribers sessions were flapped. [Defect ID 187716]
- Subscribers that attempt to connect after the maximum number of clients that can be serviced by a line module is reached do not receive get policy attachments. [Defect ID 91105]

PPP

- When you configure two pairs of line modules for stateful switchover on a router, specify the interim accounting interval as 10 minutes, configure the radiusSendAttribute log category to store RADIUS attributes added to accounting messages, and transmit traffic from subscribers to the core router, the value of the Acct-Session-Time RADIUS IETF attribute is incorrectly displayed in the radiusSendAttribute log after the interim accounting interval has elapsed and after a stateful line module switchover is performed. Also, if you have the interim accounting interval configured as 10 minutes, the value of the Acct-Session-Time attribute is incremented by 300 seconds instead of 600 seconds from one interval to another interim accounting interval. [Defect ID 187401]

PPPoE

- LM4 reset type: unknown software error signature (0x7adead4); file: pppoe.cc [Defect ID 91280]

QoS

- GE-2 line modules reset after the show egress-queue rates interface gigabitEthernet 3/0 rate-exceeding 250000 forwarded | inc 512000 command is entered. [Defect ID 90886]
- Incorrect value of "dropped packets" is displayed for a LM10U under "conformed" type when the **show fabric-queue detail** command is issued. [Defect ID 86755]
- Qos profiles do not create queues for interfaces. [Defect ID 91045]
- Low throughput is observed in a virtual path when traffic flows through a large number of virtual circuits. [Defect ID 91305]

RSVP-TE

- In an MPLS VPN environment, the SRP module resets and errors occur with the tunnel ID allocation logic. [Defect ID 90821]
- SRP reset type: processor exception 0x300 (data access: protection violation (read attempt)) task: rsvp_msgQueue_1. [Defect ID 91072]

SRC Software and SDX Software

- Previously configured SRC policies are removed after a reload of the router. [Defect ID 90772]
- The SRC client sends interface deletion request (DRQ) messages following address DRQ messages even if the interface was bounced to the up state during address mode [Defect ID 91160]
- After a restart of approximately four SRC server devices, about 200 of the ERX routers running BRAS services do not attempt to reestablish their COPS connections. The SRC client settings must be manually reconfigured on the impacted routers for the COPS connections to be reestablished. [Defect ID 90937]
- The COPS connection for SRC clients goes down as a result of a problem with semaphore sscL2CSemaphore. [Defect ID 91099]

Stateful SRP Switchover (High Availability) and IP Tunnels

- If two ES2 10G LMs are configured as a redundancy group with Redundancy IOA and ES2-S2 10GE PR IOA installed on the LMs, perform a switchover of line modules multiple times, and enter the redundancy revert command using a separate Telnet session when the other line module is in the booting state, the ES2 10G LM with Redundancy IOA resets. [Defect ID 91030]
- High availability state transitions to disabled after receiving the following error messages: [Defect ID 90510]

  ERROR 02/17/2010 19:12:08 ha: High availability is disabled due to a mirroring error (most likely insufficient memory)
  ERROR 02/17/2010 19:12:08 ha: Mirroring error: file: serAcker.cc, line: 1940, error counter: 2
  WARNING 02/17/2010 19:12:12 ha: High Availability is disabled. View the srp redundancy status to determine the cause.

- On E120 and E320 routers configured with an SRP module that contain a high availability pair of line modules, the primary SRP module intermittently resets when you perform a stateful SRP switchover after a stateful line module switchover is completed. This problem occurs only when login and logout of subscribers is in progress during the stateful line module switchover. [Defect ID 187189]

System

- Chassis enters the thermal protection mode due to a faulty temperature sensor. [Defect ID 90754]
- Core dump files on ES2 10G LMs are unusable after a unified ISSU operation. [Defect ID 91129]
- A memory leak is observed with the SRP module on an ERX router that acts as the LNS device on one side of an L2TP tunnel. [Defect ID 91139]
- All the ES2 4G LMs and ES2 10G LMs generate core dumps during the unified ISSU operation. [Defect ID 91214]
- ES2 10G LMs reset in a BRAS environment with PPPoE subscribers having policies applied using Service Manager. [Defect ID 91241]

Errata

This section identifies errors found in the JunosE documentation. These errors are corrected in subsequent releases of the affected documentation.

- The Routing Protocol Maximums table (for ERX310, ERX7xx, and ERX14xx routers) in *Appendix A, System Maximums*, of the *JunosE Release Notes,* for the following releases incorrectly mentions the maximum number of IP network interfaces (for IPv4 and IPv6) supported per chassis for the ERX310 router as 16,000. The correct maximum number of IP network interfaces supported per chassis for the ERX310 router is 32,000.
  - Releases 9.x, 10.x
  - Releases 11.0.0, 11.0.1, 11.0.2
  - Releases 11.1.0, 11.1.1, 11.1.2
  - Releases 11.2.0, 11.2.1
  - Release 11.3.0
  - Release 12.0.0

  The table also incorrectly mentions the maximum number of IP network interfaces (for IPv4 and IPv6) supported per line module for all ERX routers as 8000. The correct maximum number of IP network interfaces supported per line module for all ERX routers is 16,383.

  The correct values have been updated in the Routing Protocol Maximums table (for ERX310, ERX7xx, and ERX14xx routers) in *Appendix A, System Maximums*, of these *Release Notes*.
- The Routing Protocol Maximums table (for E120 and E320 routers) in *Appendix A, System Maximums*, of the *JunosE Release Notes,* for the following releases incorrectly mentions the maximum number of IP network interfaces (for IPv4 and IPv6) supported per line module for E120 and E320 routers.
  - Releases 9.x, 10.x
  - Releases 11.0.0, 11.0.1, 11.0.2
  - Releases 11.1.0, 11.1.1, 11.1.2
  - Releases 11.2.0, 11.2.1
  - Release 11.3.0
  - Release 12.0.0

  The following table lists the correct maximum number of IP network interfaces supported for the different line modules for E120 and E320 routers.

  Routing Protocol Maximums Table (for E120 and E320 Routers)

Feature	E120	E320
IP network interfaces (IPv4 and IPv6)		
Per chassis	96,001	96,001
Per ES2 4G LM	16,383	16,383
Per ES2 10G LM	16,383	16,383

Feature	E120	E320
Per ES2 10G ADV LM	32,767	32,767
Per ES2 10G Uplink LM	16,383	16,383

The correct values have been updated in the Routing Protocol Maximums table (for E120 and E320 routers) in *Appendix A, System Maximums*, of these *Release Notes*.

- The Routing Protocol Maximums table (for E120 and E320 routers) in *Appendix A, System Maximums*, of the *JunosE Release Notes,* for the following releases incorrectly mentions the maximum number of MPLS next hops (egress FECs) when graceful restart is not enabled as 500,000 for all line modules on E120 and E320 routers:
  - Releases 9.x, 10.x
  - Releases 11.0.0, 11.0.1, 11.0.2
  - Releases 11.1.0, 11.1.1, 11.1.2
  - Releases 11.2.0, 11.2.1, 11.2.2
  - Releases 11.3.0, 11.3.1
  - Release 12.0.0

  The following table lists the maximum number of MPLS next hops (egress FECs) when graceful restart is not enabled for all line modules on E120 and E320 routers:

  Routing Protocol Maximums table (for E120 and E320 routers)

Feature	E120	E320
IPv4 routing protocol scaling and peering densities		
MPLS next hops (egress FECs) when graceful restart is not enabled for ES2 4G LM	500,000	500,000
MPLS next hops (egress FECs) when graceful restart is not enabled for all line modules other than ES2 4G LM	300,000	300,000

- The following JunosE documentation set fails to mention additional information regarding the creation of core dump files when the NMI button is depressed:
  - *ERX Hardware Guide—Resetting Line Modules and SRP Modules* section in *Chapter 9, Troubleshooting*
  - *E120 and E320 Hardware Guide—Resetting Line Modules and SRP Modules* section in *Chapter 9, Troubleshooting*

  If you configure the router to generate core dumps using the **exception dump** command in Global Configuration mode, and if sufficient space is available at the destination to which the core dump files are transferred (such as the local flash card if you used the **local** keyword with the **exception dump** command), depressing the NMI button causes a core dump file to be stored on the flash card. This method of generating core dump files is applicable for both SRP modules and line modules. You can use the **show exception dump** command to determine whether core dumps are generated for only SRP modules or line modules.

- The Capability row in the Service Module (SM) Module Combination table of the *ERX Module Guide* fails to state the following additional information regarding the throughput for tunnel-server traffic:

  Service Modules on ERX7xx models, ERX14xx models, and the ERX310 router can handle up to 800 Mbps of traffic, depending on the size of the packets. The throughput might be less with packets of smaller sizes.

- The Service Modules table in *ERX Module Guide, Appendix A, Module Protocol Support* incorrectly states that IPv6 Neighbor Discovery is not supported on the Service line module. In fact, IPv6 Neighbor Discovery is supported on ERX routers that contain a Service line module.

- The Capability row in the LM-4 Line Module table of the *E120 and E320 Module Guide* fails to state the following additional information regarding the throughput for tunnel-server traffic:

  An ES2 4G LM with an ES2-S1 Service IOA (dedicated tunnel-server port) can receive traffic ranging from 3.5 Gbps (with 256 byte packets) to 3.8 Mbps (1024 to 1492 byte packets) for bidirectional L2TP LNS throughput. The throughput might be less with packets of smaller sizes.

  A shared tunnel-server port on an ES2 4G LM can handle a maximum of 0.8 to 0.9 Gbps throughput for tunnel services, depending on the packet sizes. The throughput might be less with packets of smaller sizes.

- The Ethernet IOAs with ES2 10G ADV LM table in *E120 and E320 Module Guide, Appendix A, IOA Protocol Support* erroneously indicates that tunnel-server ports are not supported for any Ethernet IOA combination with the ES2 10G ADV LM. Tunnel-server ports for shared tunnel services are supported on all Ethernet IOA combinations with the ES2 10G ADV LM.

- In the Module Combinations table in *E120 and E320 Module Guide, Appendix B, Module and Slot Combinations*, the ES2-S1 SERVICE row incorrectly states that the ES2-S1 Service IOA module cannot be paired with the ES2 10G ADV LM. The ES2-S1 Service IOA module is compatible with the ES2 10G ADV LM, in addition to the ES2 4G LM, for dedicated tunnel-server port functionality.

- The *Supported Modules for Dedicated Tunnel-Server Ports* section in *JunosE Physical Layer Configuration Guide, Chapter 6, Managing Tunnel-Service and IPSec-Service Interfaces* fails to mention that E120 and E320 routers support the ES2-S1 Service IOA and ES2 10G ADV LM combination and that you can install the ES2-S1 Service IOA with the ES2 10G ADV LM to use dedicated tunnel-server ports.

- The note in the *Configuring Tunnel-Server Ports and Tunnel-Service Interfaces* section in the *JunosE Physical Layer Configuration Guide, Chapter 6, Managing Tunnel-Service and IPSec-Service Interfaces* and the *Configuring QoS for Tunnel-Server Ports for L2TP LNS Sessions* section in the *JunosE Quality of Service Configuration Guide, Chapter 22, Configuring QoS for L2TP Sessions* does not accurately describe QoS profile support on interfaces stacked on the server-port. The following note accurately describes the QoS profile support:

Informational Note: Dedicated and shared tunnel-server ports on the ES2 10G ADV LM do not support QoS profiles on server-port interfaces and IP floating interfaces (IP interfaces that stack over MPLS stacked tunnels). However, you can configure QoS profiles for dedicated and shared tunnel-server ports on ES2 10G ADV LMs on interfaces other than server-port interfaces (such as ATM or Ethernet). On ES2 10G ADV LMs, you can also configure QoS profiles for dedicated and shared tunnel-server ports for L2TP LNS sessions only on interface types other than the server-port interface.

- The note in the *SMs, ES2-S1 Service IOA, and Shared Tunnel-Server Modules* section in *JunosE Physical Layer Configuration Guide, Chapter 6, Managing Tunnel-Service and IPSec-Service Interfaces* fails to state that in addition to ERX7xx models, ERX14xx models, and the ERX310 router, E120 and E320 routers also perform load balancing across all available server ports of the same type when both dedicated tunnel-server ports (on SMs) and shared tunnel-server ports (on shared tunnel-server modules) are configured.
- The output of the **show tunnel-server config** command in the *Identifying the Physical Location of the Tunnel-Server Port* section in *Chapter 6, Managing Tunnel-Service and IPSec-Service Interfaces,* in the *JunosE Physical Layer Configuration Guide* incorrectly displays the adapter identifier for the shared tunnel-sever port configured on slot 12 and port 0.

  In the last line of the output example, which displays Port 12/0/0 under the Port column, the adapter identifier is erroneously specified as 0. Because shared tunnel-server ports reside on a virtual adapter that is identified in the software as adapter 2, the correct slot/adapter/port combination for this configured shared tunnel-server is 12/2/0.

  The correct output of the **show tunnel-server config** command is as follows:

```
host1#show tunnel-server config

                        Server Ports
                        ------------
                                                 Provisioned                 Bandwidth-
  Port       Type      MaximumInterfaces        Interfaces    HwPresent      Reserved
--------     -------   -----------------        -----------   ---------      ---------
Port 2/2/0   shared       8000                     0             yes          N/A
Port 8/0/0   dedicated    16000                    8000          yes          N/A
Port 12/2/0  shared       8000                     0             yes          90
```

- In the *BGP Multihoming for VPLS Overview* section in *Chapter 11, VPLS Overview* of the *JunosE BGP and MPLS Configuration Guide*, the Selecting the Designated VE Device for a Multihomed Site algorithm is erroneous. The correct algorithm is as follows:

  BGP on each PE router in the VPLS network determines the best path to the multihomed site by comparing path attributes. The PE routers receiving the advertised routes first run the standard BGP selection process. The routes from the connected multihomed PE routers all share the same site ID, but can have different route distinguishers and block offsets; the routers are advertising different prefixes. The following sequence is applied to all routes on a per-prefix basis:

  1. Select a path with a reachable *next hop*.
  2. Select the path with the highest *weight*.
  3. If path weights are the same, select the path with the highest *local preference* value.
  4. Prefer locally originated routes (network routes, redistributed routes, or aggregated routes) over received routes.
  5. Select the route with the shortest *AS-path* length.
  6. If all paths have the same AS-path length, select the path based on *origin*: IGP is preferred over EGP; EGP is preferred over Incomplete.
  7. If the origins are the same, select the path with lowest *MED* value.
  8. If the paths have the same MED values, select the path learned by means of EBGP over one learned by means of IBGP.
  9. Select the path with the lowest IGP cost to the next hop.
  10. Select the path with the shortest route reflection cluster list. Routes without a cluster list are treated as having a cluster list of length 0.
  11. Select the path received from the peer with the lowest BGP router ID.
  12. Select the path that was learned from the neighbor with the lowest peer remote address.
  13. Select the path with a lower route distinguisher.

  The result of this process is the best path to the multihomed customer site through each PE router connected to the site. One best path is selected for each router. The process establishes whether the route advertised by each PE router is suitable for advertising to peer routers.

  Next, BGP runs the layer 2 multihoming selection process on this set of best paths to determine the one best path to the customer site. The result of this process establishes that the best path is suitable for establishing a pseudowire from the remote PE router to the PE router. That PE router is accordingly selected as the designated VE device.

The multihoming selection process is similar to the standard BGP process, but it omits the following two steps:

1. The process does not prefer locally originated routes. Local origination is of no value in establishing the designated VE device. The PE routers connected to the customer site always have a local route and therefore all advertise a locally originated route. These PE routers also receive the advertisements from the other connected PE routers. If the multihoming selection process preferred local origination, each of these routers would select itself as the best path.
2. The process does not take into account IGP cost in order to prevent the remote PE routers from selecting different designated VE devices in the event of a misconfiguration, such as having the same site priority on different multihomed PE routers.

- The *Specifying an OSPF Router ID* section in *Chapter 5, Configuring OSPF* in the *JunosE IP, IPv6, and IGP Configuration Guide* incorrectly specifies that the configuration mode for the **router-id** command in the example is Interface Configuration mode. This command is available only in Router Configuration mode. The correct example for this command is as follows:

  host1(config-router)#router-id 192.168.50.5

  Also, the **router-id** command section fails to state the following additional note about the function of this command for OSPFv2:

  Although you can specify the router IP address using the **ip router-id** command in Global Configuration mode for OSPFv2 interfaces, use the **router-id** command in Router Configuration mode to enable the router to use a different IP address as the OSPF router ID rather than the address used for other IP routing protocols.

- The *Duplicate and Broadcast Accounting* section in *JunosE Broadband Access Configuration Guide, Chapter 1, Configuring Remote Access* incorrectly states that the accounting information continues to be sent to the authenticating virtual router, but not to the operational virtual router, regardless of whether duplicate or broadcast AAA accounting is enabled on those routers. The following information describes the correct transmission of accounting information to authenticating virtual routers and operational virtual routers:

  The accounting information is always sent to the authenticating virtual router. The accounting information is sent to the operational virtual router only if duplicate accounting is not enabled and if the authenticating virtual router is different than the operational virtual router.

- In the Juniper Networks (Vendor ID 4874) VSA Formats table in *JunosE Broadband Access Configuration Guide, Chapter 6, RADIUS Attribute Descriptions*, the description and value of the Med-Dev-Handle VSA attribute [26-59] are incorrect.

  The correct format of the Med-Dev-Handle VSA is defined as follows:

Attribute Number	Attribute Name	Description	Length	Subtype Length	Value
[26-59]	Med-Dev-Handle	Hexadecimal string used to determine mirror header attributes, prepended to each mirrored packet that is sent to the analyzer device	len	sublen	Salt encrypted string; hexadecimal string of 4 bytes or 8 bytes

- The Juniper Networks (Vendor ID 4874) VSA Formats table in *Chapter 6, RADIUS Attribute Descriptions* of the *JunosE Broadband Access Configuration Guide* inadvertently fails to mention the RADIUS VSAs numbered 26-101 through 26-105, and their associated definitions and formats.

  See *Appendix B, RADIUS VSA Formats* in these *Release Notes* for detailed information.

- The *L2TP Module Requirements* section in *JunosE Broadband Access Configuration Guide, Chapter 11, L2TP Overview* fails to state the following additional information regarding the available bandwidth for shared tunnel-server applications:

  When you configure the GE-2 line module or the GE-HDE line module with a shared tunnel-server port, the available bandwidth for tunnel services is limited to 0.5 Gbps per module. When you configure the ES2 4G line module with a shared tunnel-server port, the available bandwidth for tunnel services is limited to 0.8 Gbps per module.

- In the *JunosE Command Reference Guide N to Z*, the following additional information for the *queueDrainRate* variable in the **snmp-server host** command is missing:

  By default, there is no limit on the number of traps sent per second to the host.

Appendix A

System Maximums

This appendix presents current system maximums for various E Series hardware configurations. An E Series router does not simultaneously support all maximum configurations.

For some entries, early field trial (EFT) values are presented in addition to supported values. These values have not been fully qualified by Juniper Networks and are mentioned only for field test purposes in this release. EFT values are enclosed within parentheses with an EFT designation; for example, (96,000 EFT).

Modules referred to in the tables are identified by their physical label. For module specifications, including their identifying labels, see *ERX Module Guide, Table 1, Module Combinations* and *E120 and E320 Module Guide, Table 1, Modules and IOAs*.

System Maximums for ERX310, ERX7xx, and ERX14xx	Section
General router values	*General System Maximums* on page 70
Physical layer values	*Physical and Logical Density Maximums* on page 71
Link layer values	*Link Layer Maximums* on page 74
Routing protocol and performance values	*Routing Protocol Maximums* on page 79
Policy and QoS values	*Policy and QoS Maximums* on page 82
Tunneling values	*Tunneling Maximums* on page 84
Subscriber management values	*Subscriber Management Maximums* on page 86

System Maximums for E120 and E320 Routers	Section
General router values	*General System Maximums* on page 89
Physical layer values	*Physical and Logical Density Maximums* on page 90
Link layer values	*Link Layer Maximums* on page 92
Routing protocol and performance values	*Routing Protocol Maximums* on page 97
Policy and QoS values	*Policy and QoS Maximums* on page 100
Tunneling values	*Tunneling Maximums* on page 104
Subscriber management values	*Subscriber Management Maximums* on page 106

ERX310, ERX7xx, and ERX14xx System Maximums

The following tables provide system maximums for the ERX310, ERX7xx, and ERX14xx routers.

General System Maximums

Table 1 lists some general system maximums for the ERX routers.

Table 1: General System Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
Fabric size	10 Gbps	5 or 10 Gbps	10 Gbps	40 Gbps
Chassis per 7-foot rack	14	6	3	3
NTP clients	1000	1000	1000	1000
NTP servers	300	300	300	300
Sessions per chassis (simultaneous Telnet + FTP + SSH, in any combination)	30	30	30	30
Virtual routers per chassis	1000	1000	1000	1000
Virtual routers per line module	1000	1000	1000	1000
ICR Partitions per chassis	640	640	640	640
ICR Partitions per line module	64	64	64	64

Physical and Logical Density Maximums

Table 2 lists physical and logical density maximums for the ERX routers. The following notes are referred to in Table 2:

1. Wire rate indicates the port density that supports maximum (wire-rate) performance. Oversubscribed indicates the port density possible when you are willing to accept less than wire-rate performance by oversubscribing the available fabric bandwidth. The ERX310 and ERX1440 routers do not support oversubscription; port densities for these models indicate wire-rate performance.
2. When you pair the GE-2 or GE-HDE line module with the GE-2 SFP I/O module on the ERX1440 router, you can terminate up to 24 Gigabit Ethernet interfaces. Slots 2 and 4 on the ERX1440 router support two Gigabit Ethernet interfaces at wire rate; the remaining 10 slots support one Gigabit Ethernet interface at wire rate. On the ERX310 router, all four ports (active and redundant) are at wire rate.

   For more information about bandwidth and line-rate considerations for the GE-2 line module or the GE-HDE line module and their corresponding I/O modules on E Series routers, see *JunosE Physical Layer Configuration Guide, Chapter 5, Configuring Ethernet Interfaces*.
3. When you pair the GE-HDE line module with the GE-8 I/O module on the ERX1440 router, you can terminate up to 96 Gigabit Ethernet interfaces. Slots 2 and 4 on the ERX1440 router support two Gigabit Ethernet interfaces at wire rate; the remaining 10 slots support one Gigabit Ethernet interface at wire rate. On the ERX310 router, only two Gigabit Ethernet interfaces per slot are at wire rate; therefore, only four Gigabit Ethernet interfaces are at wire rate for the entire router.

   For more information about bandwidth and line-rate considerations for the GE-HDE line module and the GE-8 I/O module on E Series routers, see *JunosE Physical Layer Configuration Guide, Chapter 5, Configuring Ethernet Interfaces*.
4. The OC3/STM-1 GE/FE line module and OC3-2 GE APS I/O module combination does not support line rate for Gigabit Ethernet interfaces.

Table 2: Physical and Logical Density Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
Physical density wire rate/oversubscribed (See Note 1 on page 71.)				
Channelized OC3 ports per chassis (cOC3 STM1 FO I/O modules)	8	16/20	32/48	48
Channelized OC12 ports per chassis (cOC12 STM4 FO I/O modules)	2	4/5	4/12	12
Channelized T3 ports per chassis (CT3/T3 12 I/O modules)	24	48/60	96/144	144
E3 (unchannelized) ports per chassis (CT3/T3 12 I/O modules)	24	48/60	96/144	144
Fast Ethernet (10/100) ports per chassis (FE-8 I/O and FE-8 SFP I/O modules)	16	32/40	32/96	96
Gigabit Ethernet ports per chassis (GE I/O modules)	2	4/5	4/12	12

Table 2: Physical and Logical Density Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
Gigabit Ethernet ports per chassis (GE-2 SFP I/O modules) (See Note 2 on page 71.)	4	–	–	14/24
Gigabit Ethernet ports per chassis (GE-8 I/O modules) (See Note 3 on page 71.)	4/16	–	–	14/96
Gigabit Ethernet ports per chassis (OC3-2 GE APS I/O module) (See Note 4 on page 71.)	2	4/5	4/12	12
OC3/STM-1 ATM ports per chassis (OC3-4 I/O modules)	8	16/20	32/48	48
OC3/STM-1 ATM ports per chassis (OC3-2 GE APS I/O module)	4	10	24	24
OC3/STM-1 POS ports per chassis (OC3-4 I/O modules)	8	16/20	16/48	48
OC12/STM-4 ATM ports per chassis (OC12 STM4 I/O modules)	2	4/5	8/12	12
OC12/STM-4 POS ports per chassis (OC12 STM4 I/O modules)	2	4/5	4/12	12
OC48/STM16 POS ports per chassis (OC48 FRAME I/O modules); ERX1440 router only	–	–	–	2
T3 (unchannelized) ports per chassis (4xDS3 ATM I/O modules)	8	16/20	32/48	48
T3 (unchannelized) ports per chassis (CT3/T3 12 I/O modules)	24	48/60	96/144	144
Logical density per chassis				
Logical E1s per chassis	504	1260	3024	3024
Logical E3s per chassis	24	60	144	144
Logical fractional E1s (DS0) per chassis	4000	10,000	24,000	24,000
Logical fractional T1s (DS0) per chassis	4000	10,000	24,000	24,000
Logical OC3/STM1 per chassis	8	20	48	48
Logical OC12/STM4 per chassis	2	5	12	12
Logical OC48/STM16 per chassis (ERX1440 router only)	–	–	–	2
Logical T1s per chassis	672	1680	4032	4032
Logical T3s per chassis	24	60	144	144
Logical density per module combination (specified line module and all supported I/O modules)				
Logical E1s per cOCx/STMx F0 line module	252 63 per OC3/STM1	252 63 per OC3/STM1	252 63 per OC3/STM1	252 63 per OC3/STM1
Logical E3s per COCX-F3 line module	12	12	12	12

Table 2: Physical and Logical Density Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
Logical fractional E1s (DS0) per cOCx/STMx F0 line module	2000 500 per OC3/STM1	2000 500 per OC3/STM1	2000 500 per OC3/STM1	2000 500 per OC3/STM1
Logical fractional T1s (DS0) per cOCx/STMx F0 line module	2000 500 per OC3/STM1	2000 500 per OC3/STM1	2000 500 per OC3/STM1	2000 500 per OC3/STM1
Logical fractional T1s (DS0) per CT3/T3-F0 line module	1992 166 per T3	1992 166 per T3	1992 166 per T3	1992 166 per T3
Logical fractional T3s (DS3) per COCX-F3 line module	12	12	12	12
Logical T1s per cOCx/STMx F0 line module	336 84 per OC3/STM1	336 84 per OC3/STM1	336 84 per OC3/STM1	336 84 per OC3/STM1
Logical T1s per CT3/T3-F0 line module	336 28 per T3	336 28 per T3	336 28 per T3	336 28 per T3
Logical T3s per COCX-F3 line module	12	12	12	12
Logical T3s per cOCx/STMx F0 line module	12 3 per OC3/STM1	12 3 per OC3/STM1	12 3 per OC3/STM1	12 3 per OC3/STM1
Logical T3s per CT3/T3-F0	12	12	12	12
Logical T3s per OCx/STMx/DS3-ATM line module with 4xDS3 ATM I/O module	4	4	4	4

Link Layer Maximums

Table 3 lists link layer maximums for the ERX routers. The following notes are referred to in Table 3:

1. The ERX1440 router supports a maximum of 48,000 interface columns of all types combined. You can use either all dynamic interfaces or a combination of dynamic and static interfaces to achieve this maximum. For bridged Ethernet, IP network, and PPP interfaces, the ERX1440 router supports a maximum of 32,000 static major interfaces. Although the ERX1440 router supports a maximum of 48,000 static major interfaces for PPPoE, the PPPoE static limit is enforced at the subinterface level, which has a limit of 32,000.

   The ERX705, ERX710, and ERX1410 routers support a maximum of 32,000 interfaces of all types combined; the ERX310 router supports a maximum of 16,000 interfaces of all types combined. For these routers, the interfaces can be any combination of dynamic or static.

   The JunosE Software supports up to 10,000 PPP interfaces with EAP authentication negotiation configured. Performance and scalability is unchanged when EAP is not configured.

2. The total maximum number of Ethernet subinterfaces that can be active at any one time on an ERX310 router, an ERX7xx router, or an ERX14xx router is limited by the number of slots per chassis. Of this total, you can configure all single-tagged VLAN subinterfaces, all double-tagged S-VLAN subinterfaces, or a combination of both VLAN subinterfaces and S-VLAN subinterfaces to achieve this maximum.

Table 3: Link Layer Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
ARP entries per line module				
Dynamic ARP entries	32,768	32,768	32,768	32,768
Static ARP entries	32,768	32,768	32,768	32,768
Total ARP entries	32,768	32,768	32,768	32,768
ATM bulk configuration VC ranges per chassis	300	300	300	300
ATM bulk configuration VC ranges per line module	300	300	300	300
ATM bulk configuration total VCs per chassis	64,000	160,000	384,000	384,000
ATM bulk configuration total VCs per line module				
OCx/STMx/DS3-ATM	32,000	32,000	32,000	32,000
OC3/STM1 GE/FE	32,000	32,000	32,000	32,000
ATM bulk configuration overriding profile assignments per chassis	100	100	100	100
ATM VCs per chassis (active/configured)	16,000/32,000	32,000/64,000	32,000/64,000	48,000/96,000

Table 3: Link Layer Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
ATM VCs per line module				
OCx/STMx/DS3-ATM (active/configured)	8000/16,000	8000/16,000	8000/16,000	8000/16,000
OC3/STM1 GE/FE (active/configured)	8000/16,000	8000/16,000	8000/16,000	8000/16,000
ATM VCs per port				
OCx/STMx/DS3-ATM (active/configured)	8000/16,000	8000/16,000	8000/16,000	8000/16,000
OC3/STM1 GE/FE (active/configured)	8000/16,000	8000/16,000	8000/16,000	8000/16,000
ATM VC classes per chassis	100	100	100	100
ATM VP/VC addresses per line module				
OCx/STMx/DS3-ATM	20-bit	20-bit	20-bit	20-bit
OC3/STM1 GE/FE	20-bit	20-bit	20-bit	20-bit
ATM VP tunnels per port, all supported modules	256	256	256	256
Bridged Ethernet interfaces per chassis (See Note 1 on page 74.)	16,000	32,000	32,000	48,000
Bridged Ethernet interfaces per line module				
OCx/STMx/DS3-ATM	8192	8192	8192	8192
OC3/STM-1 GE/FE	8192	8192	8192	8192
Dynamic interfaces				
Active autosensed dynamic interface columns per chassis over static or dynamic (bulk) ATM1483 subinterfaces	16,000	32,000	32,000	48,000
Ethernet 802.3ad Link Aggregation				
Links per LAG (bundle)	8	8	8	8
LAGs (bundles) per chassis	64	64	64	64
Ethernet S-VLANs per chassis (See Note 2 on page 74.)	32,768	81,920	96,000	96,000
Ethernet S-VLANs per I/O module				
FE-8 I/O and FE-8 SFP I/O	16,384	16,384	16,384	16,384
GE I/O	16,384	16,384	16,384	16,384
GE-2 SFP I/O	16,384	–	–	16,384
GE-8 I/O	16,384	–	–	16,384
OC3-2 GE APS I/O	16,384	16,384	16,384	16,384

Table 3: Link Layer Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
Ethernet VLANs per chassis (See Note 2 on page 74.)	32,768	81,920	96,000	96,000
Ethernet VLANs per I/O module (no more than 4096 VLANs per port)				
FE-8 I/O and FE-8 SFP I/O	8192	8192	8192	8192
GE I/O	4096	4096	4096	4096
GE-2 SFP I/O	8192	–	–	8192
GE-8 I/O	16,384	–	–	16,384
OC3-2 GE APS I/O	4096	4096	4096	4096
Ethernet VLAN bulk configuration VLAN ranges per chassis	300	300	300	300
Ethernet VLAN bulk configuration VLAN ranges per line module	300	300	300	300
Ethernet VLAN overriding profile assignments per chassis	200	200	200	200
Ethernet VRRP VRIDs per line module	800	800	800	800
Frame Relay virtual circuits per chassis	2000	5000	12,000	12,000
Frame Relay virtual circuits per line module				
COCX-F3	1000	1000	1000	1000
cOCx/STMx F0	1000	1000	1000	1000
OC48 (ERX1440 router only)	–	–	–	1000
Frame Relay virtual circuits per port				
COCX-F3	1000	1000	1000	1000
cOCx/STMx F0	1000	1000	1000	1000
OC48 (ERX1440 router only)	–	–	–	1000
HDLC interfaces per chassis	4000	10,000	24,000	24,000
HDLC interfaces per line module				
COCX-F3	12	12	12	12
cOCx/STMx F0	2000	2000	2000	2000
CT3/T3 F0	1992	1992	1992	1992
OCx/STMx/DS-3 ATM	8000	8000	8000	8000

Table 3: Link Layer Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
OCx/STMx POS	4	4	4	4
OC48 (ERX1440 router only)	–	–	–	1
MLFR bundles per chassis	5000	5000	5000	5000
MLFR bundles per line module	Bundles per line module are limited only by the availability of interface columns on the module. Because a bundle requires at least one interface column, the number of bundles cannot exceed the number of interface columns.			
MLPPP bundles per chassis	12,000	12,000	12,000	12,000
MLPPP bundles per line module	The maximum number of MLPPP bundles supported per line module is the lesser of the maximum number of MLPPP bundles supported per chassis or of the maximum number of interfaces supported on the line module. For more information, see the *JunosE Link Layer Configuration Guide*.			
PPP interfaces per chassis (See Note 1 on page 74.)	16,000	32,000	32,000	48,000
PPP interfaces per line module				
COCX-F3	12	12	12	12
cOCx/STMx FO	2000	2000	2000	2000
GE/FE	8000	8000	8000	8000
GE-2	8000	–	–	8000
GE-HDE	8000	–	–	8000
OCx/STMx/DS-3 ATM	8000	8000	8000	8000
OC3/STM-1 GE/FE	8000	8000	8000	8000
OCx/STMx POS	4	4	4	4
OC48 (ERX1440 router only)	–	–	–	1
PPP packet logging				
Aggregate dynamic and static PPP interfaces for which you can log PPP packets per chassis	32	32	32	32
PPPoE service name tables				
PPPoE service name tables per chassis	16	16	16	16
Service name tags per PPPoE service name table (including one empty service name tag)	17	17	17	17

Table 3: Link Layer Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
PPPoE subinterfaces				
Subinterfaces per chassis (See Note 1 on page 74.)	16,000	32,000	32,000	48,000
Subinterfaces per GE/FE line module	8000	8000	8000	8000
Subinterfaces per GE-2 line module	8000	–	–	8000
Subinterfaces per GE-HDE line module	8000	–	–	8000
Subinterfaces per OCx/STMx/DS-3 ATM line module	8000	8000	8000	8000
Subinterfaces per OC3/STM-1 GE/FE line module	8000	8000	8000	8000
Transparent bridging and VPLS				
Bridge groups or VPLS instances per chassis	1024	1024	1024	1024
Bridge interfaces per line module in bridge groups or VPLS instances	8000	8000	8000	8000
Bridge interfaces per chassis in bridge groups or VPLS instances	16,000	32,000	32,000	32,000
Learned MAC address entries combined for all bridge groups and VPLS instances on a chassis	64,000	64,000	64,000	64,000

Routing Protocol Maximums

Table 4 lists routing protocol maximums for the ERX routers. The following notes are referred to in Table 4:

1. The total set of FTEs can be shared by interfaces, next hops, ECMP sets, VRs, and VRFs. Next-hop FTEs identify the next hop on multiaccess media, such as ATM multipoint, Ethernet, or bridged Ethernet. Each VR or VRF consumes three entries. Each interface, next hop, and ECMP set consumes a single entry. One FTE is reserved for internal use, and the system software limits the number of FTEs used by interfaces to a maximum of 32,000. The remaining FTEs can be shared across the other types.
2. The ERX1440 router supports a maximum of 48,000 interfaces of all types combined. You can use either all dynamic interfaces or a combination of dynamic and static interfaces to achieve this maximum. The ERX1440 router supports a maximum of 32,000 static PPP/PPPoE interfaces and a maximum of 36,500 static IP network interfaces. Bridged Ethernet does not enforce a limit so IP interfaces created on Bridged Ethernet can scale to the IP maximum of 36,500.

   The ERX705, ERX710, and ERX1410 routers support a maximum of 32,000 IP network interfaces; the ERX310 router supports a maximum of 16,000 IP network interfaces. For all these models, the interfaces can be any combination of dynamic or static.
3. These values are subject to limitations on available SRP module memory, which varies according to your router configuration.
4. Depending on your configuration, the router may support more routing table entries or fewer routing table entries than this value. In any case, you can choose to limit the number of routes that can be added to the routing table on a per-VR or per-VRF basis by means of the **maximum routes** command.
5. The maximum number of ANCP adjacencies can be scaled over a maximum of 100 virtual routers. Fewer ANCP adjacencies can be scaled in configurations with more than 100 virtual routers.
6. This maximum is not valid for Frame Relay. The Frame Relay maximum is 1000 circuits over MPLS per line module, because only 1000 Frame Relay DLCIs are permitted per line module.
7. On the ERX1440 router, you can achieve 32,767 total Martini circuits over ATM or Ethernet interfaces. For all routers, the total Martini can be any combination of external inter-router circuits and internal circuits (local cross-connects).
8. There is no per-VR limit; all multicast routes can be on a single VR or present across multiple VRs.
9. The maximum number of interfaces can be achieved by any combination; for example, two streams each being replicated to 32,768 interfaces; 16,384 streams each being replicated four times; or any other combination.

10. Dynamic values represent typical limits that vary depending on configuration details and actual dynamic behavior. For dynamic values only, multiple server modules (SMs) in a chassis can improve the values as long as the multiple server modules are online and the number of virtual routers configured with NAT is greater than or equal to the number of server modules. If a server module fails, the load is redistributed to the remaining server modules, with a consequent reduction in aggregate capacity.
11. Static and dynamic translations occupy the same table; therefore, the number of static translation entries present in the table reduces the room for dynamic entries.

Table 4: Routing Protocol Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
BFD				
Sessions per line module	50	50	50	50
ECMP maximum paths to a destination				
BGP, IS-IS, MPLS, OSPF, RIP	16	16	16	16
IPv4 forwarding table entries per chassis (See Note 1 on page 79.)	1,048,576	1,048,576	1,048,576	1,048,576
IP network interfaces (IPv4 and IPv6)				
Per chassis (See Note 2 on page 79.)	32,000	32,000	32,000	48,000
Per line module	16,383	16,383	16,383	16,383
IPv4 routing protocol scaling and peering densities (See Note 3 on page 79.)				
Routing table entries (See Note 4 on page 79.)	500,000	500,000	500,000	500,000
ANCP Adjacency Scaling (See Note 5 on page 79.)	5000	5000	5000	5000
BGP-4 peering sessions	1000	1000	1000	1000
BGP-4 routes (NLRI)	1,500,000	1,500,000	1,500,000	1,500,000
IP next hops (egress FECs)	1,000,000	1,000,000	1,000,000	1,000,000
MPLS next hops (egress FECs)	500,000	500,000	500,000	500,000
MPLS forwarding entries	64,000	64,000	64,000	64,000
IS-IS adjacencies	150	150	150	150
IS-IS routes	20,000	20,000	20,000	20,000
MPLS LDP LSPs	10,000	10,000	10,000	10,000
MPLS RSVP-TE LSPs	10,000	10,000	10,000	10,000
OSPF adjacencies	1000	1000	1000	1000
OSPF routes	25,000	25,000	25,000	25,000

Table 4: Routing Protocol Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
IPv6 routing table entries (See Note 3 on page 79.)	50,000	50,000	50,000	50,000
J-Flow statistics				
J-Flow–enabled VRs and VRFs, in any combination	16	16	16	16
Sampled interfaces per VR or VRF	32	32	32	32
Total sampled Interfaces per chassis	512	512	512	512
Martini circuits for layer 2 services over MPLS				
Total Martini circuits per line module (See Note 6 on page 79.)	8000	8000	8000	8000
Total Martini circuits per chassis (See Note 7 on page 79.)	16,000	16,000	16,000	32,767
External Martini circuits per chassis	16,000	16,000	16,000	32,767
Internal Martini circuits (local cross-connects) per chassis	16,000	16,000	16,000	32,767
Mobile IP bindings per chassis	–	–	–	48,000
Multicast routes (IPv4 and IPv6)				
Forwarding entries [(S,G) pairs] per chassis (See Note 8 on page 79.)	16,384	16,384	16,384	16,384
Outgoing interfaces per chassis (See Note 9 on page 79.)	65,536	65,536	65,536	65,536
Network Address Translation (NAT)				
Static translations (simple or extended) per chassis	96,000	96,000	96,000	96,000
Dynamic simple translations (NAT) per SM (See Notes 10 and 11 on page 80.)	400,000	400,000	400,000	400,000
Dynamic extended translations (NAPT) per SM (See Notes 10 and 11 on page 80.)	200,000	200,000	200,000	200,000
Response Time Reporter simultaneous operations per VR	500	500	500	500
VRRP VRIDs per line module	See *Ethernet VRRP VRIDs per line module* on page 76.			

Policy and QoS Maximums

Table 5 lists policy and QoS maximums for the ERX routers. The following notes are referred to in Table 5:

1. The OC48 line module supports only 131,071 entries. The GE-2 and GE-HDE line modules support only 65,535 entries.
2. For line modules other than the GE-2, GE-HDE, and OC48/STM16 line modules, the router supports two sizes of policies: 8127 policies, each with a maximum of 32 classifiers, and 16,255 policies, each with a maximum of 16 classifiers. A combination of the two sizes of policies is also supported, in which case the total number of policies is between 8127 and 16,255, depending on the actual configuration.
3. The GE-2, GE-HDE, and OC48/STM16 line modules support CAM classifiers instead of hardware policy assignments. For most configurations, each classifier entry in a policy consumes one CAM entry. However, a policy that has only the default classifier consumes no CAM resources. Policies that use CAM hardware classifiers consume one interface attachment resource, regardless of the number of classifier entries in a policy.

Table 5: Policy and QoS Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
QoS queues per line module	49,000	49,000	49,000	49,000
QoS profiles configurable per chassis	1000	1000	1000	1000
QoS profile attachments per chassis	96,000	96,000	96,000	96,000
QoS profile attachments per line module	16,000	16,000	16,000	16,000
QoS shapers per line module	64,000	64,000	64,000	64,000
Classification rules per policy	512	512	512	512
Policy classification (CLACL) entries per line module (See Note 1 on page 82.)	256,000	256,000	256,000	256,000
Unique hardware policy assignments per line module for modules other than the GE-2, GE-HDE, and OC48/STM16 (See Note 2 on page 82.)	8127/16,255	8127/16,255	8127/16,255	8127/16,255

Table 5: Policy and QoS Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
CAM entries (See Note 3 on page 82.)				
GE-2	64,000	–	–	64,000
GE-HDE	64,000	–	–	64,000
OC48/STM16	–	–	–	128,000
Policy egress interface attachments per line module				
Combined IP and IPv6 interface attachments	8191	8191	8191	8191
Combined ATM, Frame Relay, GRE, L2TP (LNS only), MPLS, and VLAN interface attachments	8191	8191	8191	8191
Policy ingress interface attachments per line module				
Combined IP and IPv6 interface attachments on GE-2, GE-HDE, and OC-48/STM16 line modules	16,383	–	–	16,383
Combined IP and IPv6 interface attachments on all other line modules	16,000	16,000	16,000	16,000
Combined ATM, Frame Relay, GRE, L2TP (LNS only), MPLS, and VLAN interface attachments	8191	8191	8191	8191
Rate limiters				
Egress per line module	24,575	24,575	24,575	24,575
Ingress per line module	24,575	24,575	24,575	24,575
Policy statistics blocks				
Egress per line module	256,000	256,000	256,000	256,000
Ingress per line module	256,000	256,000	256,000	256,000
Parent groups per line module				
GE-2, GE-HDE, and OC3/OC12 ATM line modules (Egress and Ingress)	24,575	24,575	24,575	24,575
All other line modules (Egress and Ingress)	8191	8191	8191	8191
Software lookup blocks				
Per line module	16,383	16,383	16,383	16,383
Secure policies (for packet mirroring)				
Per line module	1022	1022	1022	1022
Per chassis	2400	2400	2400	2400

Tunneling Maximums

Table 6 lists tunneling maximums for the ERX routers. The following notes are referred to in Table 6:

1. The SM supports any combination of DVMRP, GRE, and L2TP tunnels up to a maximum of 8000 tunnels; however, no more than 4000 tunnels can be DVMRP or GRE tunnels in any combination. The ISM supports any combination of DVMRP, GRE, and L2TP tunnels over IPSec, up to a maximum of 5000 tunnels; however, no more than 4000 tunnels can be DVMRP or GRE tunnels.
2. You can have no more than 8000 L2TP/IPSec sessions per chassis.
3. For more information about supported L2TP sessions and tunnels, see JunosE Broadband Access Configuration Guide, Chapter 11, L2TP Overview.

Table 6: Tunneling Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
DVMRP (IP-in-IP) tunnels per chassis	4000	4000	4000	4000
DVMRP (IP-in-IP) tunnels per line module (See Note 1 on page 84.)				
GE-2 with shared tunnel-server ports provisioned	4000	–	–	4000
GE-HDE with shared tunnel-server ports provisioned	4000	–	–	4000
IPSec Service Module (DVMRP/IPSec tunnels)	4000	4000	4000	4000
Service Module (SM)	4000	4000	4000	4000
GRE tunnels per chassis	4000	4000	4000	4000
GRE tunnels per line module (See Note 1 on page 84.)				
GE-2 with shared tunnel-server ports provisioned	4000	–	–	4000
GE-HDE with shared tunnel-server ports provisioned	4000	–	–	4000
IPSec Service Module (GRE/IPSec tunnels)	4000	4000	4000	4000
Service Module (SM)	4000	4000	4000	4000
IPSec manual secure tunnels per chassis	256	256	256	256
IPSec transform sets per chassis	1000	1000	1000	1000
IPSec transforms per transform set	6	6	6	6
IPSec tunnels per chassis	10,000	10,000	10,000	20,000
IPSec tunnels per IPSec Service Module	5000	5000	5000	5000

Table 6: Tunneling Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
L2TP sessions per chassis (See Notes 2 and 3 on page 84.)	16,000	16,000	16,000	32,000
L2TP sessions per line module (See Notes 1 and 3 on page 84.)				
GE-2 with shared tunnel-server ports provisioned	8000	–	–	8000
GE-HDE with shared tunnel-server ports provisioned	8000	–	–	8000
IPSec Service Module (ISM; L2TP/IPSec sessions)	5000	5000	5000	5000
Service Module (SM)	16,000	16,000	16,000	16,000
L2TP tunnels per chassis	8000	8000	8000	8000
L2TP tunnels per line module (See Notes 1 and 3 on page 84.)				
GE-2 with shared tunnel-server ports provisioned	8000	–	–	8000
GE-HDE with shared tunnel-server ports provisioned	8000	–	–	8000
IPSec Service Module (L2TP/IPSec tunnels)	5000	5000	5000	5000
Service Module	8000	8000	8000	8000

Subscriber Management Maximums

Table 7 lists subscriber management maximums for the ERX routers. The following notes are referred to in Table 7:

1. DHCP relay proxy maintains a list of active DHCP clients up to a maximum of 100,000 clients per chassis for all virtual routers. DHCP relay does not maintain a list of DHCP clients.

   DHCP relay proxy is notified of DHCP client deletions and subsequently deletes the client's host routes. In contrast, DHCP relay is not notified of DHCP client deletions, so the host routes for deleted clients remain in DHCP relay until you permanently delete them with the **set dhcp relay discard-access-routes** command. A maximum of 100,000 host routes for DHCP clients can be stored for all DHCP relay and DHCP relay proxy instances (that is, for all virtual routers).

2. The ERX1440 router supports a maximum of 48,000 interface columns of all types combined. You can use either all dynamic interfaces or a combination of dynamic and static interfaces to achieve this maximum. For bridged Ethernet, IP network, and PPP interfaces, the ERX1440 router supports a maximum of 32,000 static major interfaces. Although the ERX1440 router supports a maximum of 48,000 static major interfaces for PPPoE, the PPPoE static limit is enforced at the subinterface level, which has a limit of 32,000.

   The ERX705, ERX710, and ERX1410 routers support a maximum of 32,000 interfaces of all types combined; the ERX310 router supports a maximum of 16,000 interfaces of all types combined. For these routers, the interfaces can be any combination of dynamic or static.

   The JunosE Software supports up to 10,000 PPP interfaces with EAP authentication negotiation configured. Performance and scalability is unchanged when EAP is not configured.

3. For DHCPv6 local server, up to 32,000 subscribers and clients are supported on PPP/ATM and PPPoE/ATM with dynamic interfaces. Interface flapping tests have been qualified for 8000 subscribers and interfaces.

Table 7: Subscriber Management Maximums

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
DHCP external server clients (per chassis for all virtual routers; and per virtual router) (See Note 1 on page 86.)	100,000	100,000	100,000	100,000
DHCP local server (See Note 2 on page 86.)				
Client bindings per chassis	96,000	96,000	96,000	96,000
Client interfaces per chassis	16,000	32,000	32,000	48,000
Local address pools per virtual router	4000	4000	4000	4000
IP addresses per local address pool	32,000	32,000	32,000	32,000

Table 7: Subscriber Management Maximums Table continued

Feature	ERX310	ERX705 and ERX710	ERX1410	ERX1440
DHCPv6 local server				
Clients (See Note 3 on page 86.)	32,000	32,000	32,000	32,000
DHCP relay and relay proxy client (See Notes 1 and 2 on page 86.)				
DHCP client host routes for DHCP relay and DHCP relay proxy combined (per chassis for all virtual routers; and per virtual router)	100,000	100,000	100,000	100,000
DHCP relay proxy clients (per chassis for all virtual routers; and per virtual router)	100,000	100,000	100,000	100,000
Interfaces (per chassis for all virtual routers; and per virtual router)	16,000	32,000	32,000	48,000
Local authentication server				
Local user databases per chassis	100	100	100	100
Users per local user database	100	100	100	100
Users for all local user databases	100	100	100	100
RADIUS requests				
Concurrent RADIUS authentication requests	4000	4000	4000	32,000
Concurrent RADIUS accounting requests	4000	4000	4000	96,000
RADIUS route-download server downloaded routes per chassis	32,000	32,000	32,000	32,000
Service Manager				
Service definitions	2048	2048	2048	2048
Service sessions (active)	131,072	131,072	131,072	131,072
Active subscriber sessions	16,000	32,000	32,000	48,000
SRC Software and SDX Software				
COPS client instances	200	200	200	200
SRC clients	200	200	200	200
SRC interfaces	16,000	32,000	32,000	48,000
Subscriber interfaces (See Note 2 on page 86.)				
Dynamic subscriber interfaces per chassis'	16,000	32,000	32,000	48,000
Dynamic subscriber interfaces per line module	8000	8000	8000	8000
Static subscriber interfaces per chassis	16,000	32,000	32,000	48,000
Static subscriber interfaces per line module	8000	8000	8000	8000

Informational Note: The system maximum and line card maximum values mentioned in the tables are for single dimension scaling only. We recommend that you test scenarios which require scaling of multiple features to the maximum values concurrently, before deploying.
For example, on ERX1440 routers we support 48,000 PPP subscribers and 1, 500, 000 BGP 4 routes (NLRI). These values are independent of each other. We recommend that you test if the system can concurrently support 48,000 PPP subscribers and 1,500,000 BGP 4 routes (NLRI), before deploying.

E120 and E320 System Maximums

The following tables provide system maximums for the E120 router and the E320 router.

General System Maximums

Table 8 lists some general system maximums for the E120 router and the E320 router. The following notes are referred to in Table 8:

1. The maximum number applies to any combination of VRs and VRFs. The number of VRs and VRFs that you can configure depends on your configuration. You cannot achieve the maximum number if each VR and VRF instance is running a routing protocol.
2. The maximum of 3000 VRs and VRFs can be achieved only with the SRP-120 and SRP-320 modules, which have 4 GB of memory. The limits cannot be achieved with the SRP-100 module, which has 2 GB of memory.

Table 8: General System Maximums

Feature	E120	E320
Fabric size	120 Gbps	100 Gbps/320 Gbps
Chassis per 7-foot rack	6	3
NTP clients	1000	1000
NTP servers	300	300
Sessions per chassis (simultaneous Telnet + FTP + SSH, in any combination)	30	30
Virtual routers and VRFs per chassis, combined (See Notes 1 and 2 on page 89.)	3000	3000
Virtual routers and VRFs per line module, combined (See Notes 1 and 2 on page 89.)	3000	3000
ICR Partitions per chassis	640	640
CR Partitions per line module	64	64

Physical and Logical Density Maximums

Table 9 lists physical and logical density maximums for the E120 router and the E320 router. The following notes are referred to in Table 9:

1. Wire rate indicates the port density that supports maximum (wire-rate) performance. Oversubscribed indicates the port density possible if you are willing to accept less than wire-rate performance by oversubscribing the available fabric bandwidth.
2. With a 120 Gbps configuration on the E120 router, you can install up to 6 combinations of ES2 10G Uplink LMs, ES2 10G LMs, or ES2 10G ADV LMs in slots numbered 0-5. You can install a maximum of 6 active ports and 6 redundant ports at any time.

   With a 100 Gbps fabric configuration on the E320 router, you must install the ES2 10G Uplink LM or the ES2 10G LM in either of the E320 router turbo slots (2 and 4). When the ES2 10G Uplink LM or the ES2 10G LM is installed in slot 2 or slot 4, you cannot install another line module in slot 3 or slot 5. In this case, you can only install the ES2 4G LM in slots 0–1 and 6–11; therefore, the maximum number of ports and the forwarding performance per chassis is reduced for the IOAs that pair with the ES2 4G LM.

   With a 320 Gbps fabric configuration on the E320 router, you can install up to 12 combinations of ES2 10G Uplink LMs, ES2 10G LMs, or ES2 10G ADV LMs in slots numbered 0-5 and 11-16. You can install a maximum of 12 active ports and 12 redundant ports at any time.

Table 9: Physical and Logical Density Maximums

Feature	E120	E320
Physical density wire rate/oversubscribed (See Note 1 on page 90.)		
10-Gigabit Ethernet ports per chassis (ES2-S1 10GE IOA)	6	12
10-Gigabit Ethernet ports per chassis (ES2-S2 10GE PR IOA) (See Note 2 on page 90.)	6 + 6	12 + 12
Gigabit Ethernet ports per chassis (ES2-S1 GE-4 IOAs)	24	48
Gigabit Ethernet ports per chassis (ES2-S1 GE-8 IOAs) (See Note 2 on page 90.)	96	192
Gigabit Ethernet ports per chassis (ES2-S3 GE-20 IOA) (See Note 2 on page 90.)	120	240
OC3/STM-1 ATM ports per chassis (ES2-S1 OC3-8 STM1 ATM IOAs)	96	192
OC12/STM-4 ATM ports per chassis (ES2-S1 OC12-2 STM4 ATM IOAs)	24	48
OC12/STM-4 POS ports per chassis (ES2-S1 OC12-2 STM4 POS IOAs)	24	48
OC48/STM16 ports per chassis (ES2-S1 OC48 STM16 POS IOAs)	6	12

Table 9: Physical and Logical Density Maximums Table continued

Feature	E120	E320
Logical density per chassis		
Logical OC3/STM1 per chassis	96	192
Logical OC12/STM4 per chassis	24	48
Logical OC48/STM16 per chassis	6	12

Link Layer Maximums

Table 10 lists link layer maximums for the E120 router and the E320 router. The following notes are referred to in Table 10:

1. On the ES2 10G LM, ES2 10G ADV LM, or ES2 10 G Uplink LM, you can have configurations with up to 100,000 static entries that support 100,000 DHCP relay proxy clients. You can have an additional 28,000 static or dynamic entries for network resources, such as RADIUS and DHCP servers. However, the total number of dynamic entries in the ARP table is still restricted to a maximum of 32,768 per line module.
2. On the E120 router, the SRP-120 and the SRP-320 support a maximum of 64,000 interfaces.

   On the E320 router, the SRP-320 supports a maximum of 96,000 interfaces. The SRP-100 supports a maximum of 64,000 interfaces.
3. The E120 router supports a maximum of 64,000 interface columns of all types combined. The E320 router supports a maximum of 96,000 interface columns of all types combined. You can use all dynamic interfaces, or all static interfaces, or a combination of dynamic and static interfaces to achieve this maximum.

   The JunosE Software supports up to 10,000 PPP interfaces with EAP authentication negotiation configured. Performance and scalability is unchanged when EAP is not configured.
4. The E120 router supports a maximum of 64,000 Ethernet subinterfaces that can be active at any one time. The E320 router supports a maximum of 96,000 Ethernet subinterfaces that can be active at any one time. Of this total, you can configure all single-tagged VLAN subinterfaces, all double-tagged S-VLAN subinterfaces, or a combination of both VLAN subinterfaces and S-VLAN subinterfaces to achieve this maximum.
5. The E120 router and the E320 router support 16,384 VLAN subinterfaces per slot on the ES2 4G LM and the ES2 10G LM, and 32,768 VLAN subinterfaces per slot on the ES2 10G ADV LM. On the E120 router, a maximum of 64,000 VLAN subinterfaces is supported per chassis. On the E320 router, a maximum of 96,000 VLAN subinterfaces is supported per chassis. You can use all dynamic interfaces, or all static interfaces, or a combination of dynamic and static interfaces to achieve this maximum.
6. For all LMs, no more than 16,384 S-VLANs are supported per port. The ES2 10G ADV LM supports 32,768 S-VLANs per module. All other LMs support only 16,384 S-VLANs per module.
7. For all LMs, no more than 4096 VLANs are supported per port. The ES2 10G ADV LM supports 32,768 VLANs per module. All other LMs support only 16,384 VLANs per module.
8. No more than 8192 VLAN major interfaces are supported per line module.

Table 10: Link Layer Maximums

Feature	E120	E320
ARP entries per line module		
Dynamic entries per LM	32,768	32,768
Static entries per ES2 4G LM	32,768	32,768

Table 10: Link Layer Maximums Table continued

Feature	E120	E320
Static entries per ES2 10G LM, ES2 10G ADV LM, or ES2 10G Uplink LM (See Note 1 on page 92.)	128,000	128,000
Total entries per ES2 4G LM	32,768	32,768
Total entries per ES2 10G LM, ES2 10G ADV LM, or ES2 10G Uplink LM (See Note 1 on page 92.)	128,000	128,000
ATM bulk configuration VC ranges per chassis	300	1025
ATM bulk configuration VC ranges per line module	300	1025
ATM bulk configuration total VCs per chassis	192,000	384,000
ATM bulk configuration total VCs per line module		
ES2 4G LM and OCx/STMx ATM IOA	32,000	32,000
ATM bulk configuration overriding profile assignments per chassis	100	100
ATM VCs per chassis (See Note 2 on page 92.)	64,000	96,000
ATM VCs per line module		
ES2 4G LM and OCx/STMx ATM IOA	16,000	16,000
ATM VCs per port		
ES2 4G LM and OCx/STMx ATM IOA	16,000	16,000
ATM VC classes per chassis	100	100
ATM VP/VC addresses per line module		
ES2 4G LM and OCx/STMx ATM IOA	24-bit	24-bit
ATM VP tunnels per port, all supported modules	256	256
Bridged Ethernet interfaces per chassis (See Notes 2 and 3 on page 92.)	64,000	96,000
Bridged Ethernet interfaces per line module (OCx/STMx ATM)	16,000	16,000

Table 10: Link Layer Maximums Table continued

Feature	E120	E320
Dynamic interfaces		
Active autosensed dynamic interface columns per chassis over static or dynamic (bulk) ATM1483 subinterfaces (See Note 2 on page 92.)	64,000	96,000
Ethernet 802.3ad Link Aggregation		
Links per LAG (bundle)	8	8
LAGs (bundles) per chassis	64	64
Ethernet S-VLANs per chassis (See Notes 2, 4, and 5 on page 92.)	64,000	96,000
Ethernet S-VLANs per IOA (See Note 6 on page 92.)		
ES2-S1 GE-4 IOA (with ES2 4G LM)	16,384	16,384
ES2-S1 GE-8 IOA (with ES2 4G LM or ES2 10G LM)	16,384	16,384
ES2-S1 GE-8 IOA (with ES2 10G ADV LM)	32,768	32,768
ES2-S1 10GE IOA (with ES2 4G LM)	16,384	16,384
ES2-S2 10GE PR IOA (with ES2 10G LM or ES2 10G Uplink LM)	16,384	16,384
ES2-S2 10GE PR IOA (with ES2 10G ADV LM)	32,768	32,768
ES2-S3 GE-20 IOA (with ES2 10G LM)	16,384	16,384
ES2-S3 GE-20 IOA (with ES2 10G ADV LM)	32,768	32,768
Ethernet VLANs per chassis (See Notes 2, 4, and 5 on page 92.)	64,000	96,000
Ethernet VLANs per IOA (See Note 7 on page 92.)		
ES2-S1 GE-4 IOA (with ES2 4G LM) (See Note 5 on page 92.)	16,384	16,384
ES2-S1 GE-8 IOA (with ES2 4G LM or ES2 10G LM) (See Note 5 on page 92.)	16,384	16,384
ES2-S1 GE-8 IOA (with ES2 10G ADV LM) (See Note 5 on page 92.)	32,768	32,768

Table 10: Link Layer Maximums Table continued

Feature	E120	E320
ES2-S1 10GE IOA (with ES2 4G LM) (See Note 5 on page 92.)	16,384	16,384
ES2-S2 10GE PR IOA (with ES2 10G LM, ES2 10G ADV LM, or ES2 10G Uplink LM) (See Note 5 on page 92.)	4096	4096
ES2-S3 GE-20 IOA (with ES2 10G LM)	16,384	16,384
ES2-S3 GE-20 IOA (with ES2 10G ADV LM)	32,768	32,768
Ethernet VLAN major interfaces over Bridged Ethernet Interfaces, per IOA (See Note 8 on page 92.)		
ES2-S1 GE-4 IOA (with ES2 4G LM)	8192	8192
ES2-S1 GE-8 IOA (with ES2 4G LM, ES2 10G LM, or ES2 10G ADV LM)	8192	8192
ES2-S1 10GE IOA (with ES2 4G LM)	8192	8192
ES2-S2 10GE PR IOA (with ES2 10G LM, ES2 10G ADV LM, or ES2 10G Uplink LM)	4096	4096
ES2-S3 GE-20 IOA (with ES2 10G LM or ES2 10G ADV LM)	8192	8192
Ethernet VLAN bulk configuration VLAN ranges per chassis	1000	1000
Ethernet VLAN bulk configuration VLAN ranges per line module	500	500
Ethernet VLAN overriding profile assignments per chassis	200	200
Ethernet VRRP VRIDs per line module	800	800
HDLC interfaces per chassis	24,000	24,000
HDLC interfaces per line module	8000	8000
MLPPP bundles per chassis	12,000	12,000
MLPPP bundles per line module	The maximum number of MLPPP bundles supported per line module is the lesser of the maximum number of MLPPP bundles supported per chassis or of the maximum number of interfaces supported on the line module. For more information, see the *JunosE Link Layer Configuration Guide*.	

Table 10: Link Layer Maximums Table continued

Feature	E120	E320
PPP major interfaces per chassis (See Notes 2 and 3 on page 92.)	64,000	96,000
PPP major interfaces per line module (ignoring physical interface constraints)		
ES2 4G LM	16,000	16,000
ES2 10G LM	16,000	16,000
ES2 10G ADV LM	32,000	32,000
PPP subinterfaces per chassis (See Notes 2 and 3 on page 92.)	64,000	96,000
PPP subinterfaces per line module (ignoring physical interface constraints)		
ES2 4G LM	16,000	16,000
ES2 10G LM	16,000	16,000
ES2 10G ADV LM	32,000	32,000
PPP packet logging		
Aggregate dynamic and static PPP interfaces for which you can log PPP packets per chassis	32	32
PPPoE service name tables		
PPPoE service name tables per chassis	16	16
Service name tags per PPPoE service name table (including one empty service name tag)	17	17
PPPoE subinterfaces per chassis (See Notes 2 and 3 on page 92.)	64,000	96,000
PPPoE subinterfaces per line module		
ES2 4G LM	16,000	16,000
ES2 10G LM	16,000	16,000
ES2 10G ADV LM	32,000	32,000
Transparent bridging and VPLS		
Bridge groups or VPLS instances per chassis	1024	1024
Bridge interfaces per line module in bridge groups or VPLS instances	8000	8000
Bridge interfaces per chassis in bridge groups or VPLS instances	32,000	32,000
Learned MAC address entries combined for all bridge groups and VPLS instances on a chassis	64,000	64,000

Routing Protocol Maximums

Table 11 lists routing protocol maximums for the E120 router and the E320 router. The following notes are referred to in Table 11:

1. The total set of FTEs can be shared by interfaces, next hops, ECMP sets, VRs, and VRFs. Next-hop FTEs identify the next hop on multiaccess media, such as ATM multipoint, Ethernet, or bridged Ethernet. Each VR or VRF consumes three entries. Each interface, next hop, and ECMP set consumes a single entry. One FTE is reserved for internal use, and the system software limits the number of FTEs used by interfaces to a maximum of 32,000. The remaining FTEs can be shared across the other types.
2. You can use either all dynamic interfaces or a combination of dynamic and static interfaces to achieve this maximum.
3. These values are subject to limitations on available SRP module memory, which varies according to your router configuration.
4. Depending on your configuration, the router may support more routing table entries or fewer routing table entries than this value. In any case, you can choose to limit the number of routes that can be added to the routing table on a per-VR or per-VRF basis by means of the **maximum routes** command.
5. The maximum number of ANCP adjacencies can be scaled over a maximum of 100 virtual routers. Fewer ANCP adjacencies can be scaled in configurations with more than 100 virtual routers.
6. On the E320 router, you can achieve 32,767 total Martini circuits only over Ethernet interfaces. For all routers, the total Martini circuits can be any combination of external inter-router circuits and internal circuits (local cross-connects).
7. There is no per-VR limit; all multicast routes can be on a single VR or present across multiple VRs.
8. The maximum number of interfaces can be achieved by any combination; for example, two streams each being replicated to 32,768 interfaces; 16,384 streams each being replicated four times; or any other combination.

Table 11: Routing Protocol Maximums

Feature	E120	E320
BFD		
Sessions per line module for ES2 4G LM	100	100
Sessions per line module for all modules other than ES2 4G LM	50	50
ECMP maximum paths to a destination		
BGP, IS-IS, MPLS, OSPF, RIP	16	16
IPv4 forwarding table entries per chassis (See Note 1 on page 97.)	1,048,576	1,048,576

Table 11: Routing Protocol Maximums Table continued

Feature	E120	E320
IP network interfaces (IPv4 and IPv6)		
Per chassis (See Note 2 on page 97.)	96,001	96,001
Per ES2 4G LM	16,383	16,383
Per ES2 10G LM	16,383	16,383
Per ES2 10G ADV LM	32,767	32,767
Per ES2 10G Uplink LM	16,383	16,383
IPv4 routing protocol scaling and peering densities (See Note 3 on page 97.)		
Routing table entries (See Note 4 on page 97.)	500,000	500,000
ANCP Adjacency Scaling (See Note 5 on page 97.)	5000	5000
BGP-4 peering sessions	3000	3000
BGP-4 routes (NLRI)	1,500,000	1,500,000
IP next hops (egress FECs); used to represent the IP addresses of next-hop routers on Ethernet interfaces	1,000,000	1,000,000
MPLS next hops (egress FECs) when graceful restart is not enabled for ES2 4G LM	500,000	500,000
MPLS next hops (egress FECs) when graceful restart is not enabled for all line modules other than ES2 4G LM	300,000	300,000
MPLS forwarding entries when graceful restart is not enabled	64,000	64,000
MPLS forwarding entries when graceful restart is enabled	32,000	32,000
IS-IS adjacencies	150	150
IS-IS routes	20,000	20,000
MPLS LDP LSPs when graceful restart is not enabled	10,000	10,000
MPLS LDP LSPs when graceful restart is enabled	5000	5000
MPLS RSVP-TE LSPs when graceful restart is not enabled	10,000	10,000
MPLS RSVP-TE LSPs when graceful restart is enabled	5000	5000
OSPF adjacencies	1000	1000
OSPF routes	25,000	25,000
IPv6 routing table entries (See Note 3 on page 97.)	100,000	100,000
J-Flow statistics		
J-Flow–enabled VRs and VRFs, in any combination	16	16
Sampled interfaces per VR or VRF	32	32
Total sampled Interfaces per chassis	512	512

Table 11: Routing Protocol Maximums Table continued

Feature	E120	E320
Martini circuits for layer 2 services over MPLS		
Total Martini circuits per line module	16,000	16,000
Total Martini circuits per chassis (See Note 6 on page 97.)	16,000	32,767
External Martini circuits per chassis	16,000	32,767
Internal Martini circuits (local cross-connects) per chassis	16,000	32,767
Mobile IP bindings per chassis	–	96,000
Multicast routes (IPv4 and IPv6)		
Forwarding entries [(S,G) pairs] per chassis (See Note 7 on page 97.)	16,384	16,384
Outgoing interfaces per chassis (See Note 8 on page 97.)	65,536	65,536
Response Time Reporter simultaneous operations per VR	500	500
Response Time Reporter maximum tests per chassis (SRP-100 or SRP-320)	–	500
Response Time Reporter maximum tests per virtual router (SRP-100 or SRP-320)	–	100
VRRP VRIDs per line module	See *Ethernet VRRP VRIDs per line module* on page 95.	See *Ethernet VRRP VRIDs per line module* on page 95.

Policy and QoS Maximums

Table 12 lists policy and QoS maximums for the E120 router and the E320 router. The following notes are referred to in Table 12:

1. For more information about system resource requirements for nodes, queues, and shadow nodes, see *JunosE Quality of Service Configuration Guide, Chapter 15, QoS Profile Overview*. QoS is supported on all E Series line modules except for the ES2 10G Uplink LM.
2. For all line modules the maximum number of IPv4 or IPv6 or VLAN policy attachments is determined by the maximum number of interfaces multiplied by the number of attachment resources that are currently used. Attachment resources are only used when you attach the policy.

   The line modules support policy attachments based on the following considerations:

   - IPv4—Up to 2 ingress policy attachments and 1 egress policy attachment
   - IPv6—Up to 2 ingress policy attachments and 1 egress policy attachment
   - IPv4 secure policy—The ES2 4G LM, the ES2 10G LM, and the ES2 10G ADV LM support up to 1 ingress policy attachment and 1 egress policy attachment
   - IPv6 secure policy—The ES2 4G LM supports up to 1 ingress policy attachment and 1 egress policy attachment
   - VLANs—Up to 1 ingress policy attachment and 1 egress policy attachment
3. Secure policies are not supported on the ES2 10G Uplink LM. IPv6 secure policies are not supported on the ES2 10G LM.

Table 12: Policy and QoS Maximums

Feature	E120	E320
QoS queues per line module (See Note 1 on page 100.)	128,000	128,000
QoS profiles configurable per chassis	1000	1000
QoS profile attachments per chassis	96,000	96,000
QoS profile attachments per line module		
ES2 4G LM	16,000	16,000
ES2 10G LM	16,000	16,000
ES2 10G ADV LM	32,000	32,000
QoS scheduler nodes per line module	64,000	64,000
QoS shapers per line module	64,000	64,000
Classification rules per policy	512	512

Table 12: Policy and QoS Maximums Table continued

Feature	E120	E320
Policy classification (CLACL) entries per line module		
ES2 4G LM	256,000	256,000
ES2 10G LM	262,143	262,143
ES2 10G ADV LM	131, 071	131, 071
ES2 10G Uplink LM	131,071	131,071
Policy egress interface attachments per line module (See Note 2 on page 100.)		
ES2 4G LM combined IP and IPv6 interface attachments	16,383	16,383
ES2 4G LM combined ATM, GRE, L2TP (LAC only), MPLS, and VLAN interface attachments	16,383	16,383
ES2 10G LM combined IP and IPv6 interface attachments	16,383	16,383
ES2 10G LM VLAN interface attachments	16,383	16,383
ES2 10G ADV LM IP interface attachments	32,000	32,000
ES2 10G ADV LM VLAN interface attachments	32,000	32,000
ES2 10G Uplink LM combined IP and IPv6 interface attachments	16,383	16,383
ES2 10G Uplink LM VLAN interface attachments	8191	8191
Policy ingress interface attachments per line module (See Note 2 on page 100.)		
ES2 4G LM combined IP and IPv6 interface attachments	32,767	32,767
ES2 4G LM combined ATM, GRE, L2TP (LAC only), MPLS, and VLAN interface attachments	16,383	16,383
ES2 10G LM IP interface attachments	16,383	16,383
ES2 10G LM combined IP and IPv6 interface attachments	16,383	16,383
ES2 10G LM VLAN interface attachments	16,383	16,383
ES2 10G ADV LM IP interface attachments	64,000	64,000
ES2 10G ADV LM VLAN interface attachments	32,000	32,000

Table 12: Policy and QoS Maximums Table continued

Feature	E120	E320
ES2 10G Uplink LM IP interface attachments	16,383	16,383
ES2 10G Uplink LM combined IP and IPv6 interface attachments	16,383	16,383
ES2 10G Uplink LM VLAN interface attachments	8191	8191
Rate limiters (egress) per line module		
ES2 4G LM	64,000	64,000
ES2 10G LM	64,000	64,000
ES2 10G ADV LM	64,000	64,000
ES2 10G Uplink LM	64,000	64,000
Rate limiters (ingress) per line module		
ES2 4G LM	64,000	64,000
ES2 10G LM	64,000	64,000
ES2 10G ADV LM	64,000	64,000
ES2 10G Uplink LM	64,000	64,000
Policy statistics blocks (egress) per line module		
ES2 4G LM	256,000	256,000
ES2 10G LM	256,000	256,000
ES2 10G ADV LM	512,000	512,000
ES2 10G Uplink LM	256,000	256,000
Policy statistics blocks (ingress) per line module		
ES2 4G LM	256,000	256,000
ES2 10G LM	256,000	256,000
ES2 10G ADV LM	512,000	512,000
ES2 10G Uplink LM	256,000	256,000
Parent groups (egress) per line module		
ES2 4G LM	49,151	49,151
ES2 10G LM (internal parent groups only)	8191	8191
ES2 10G ADV LM (internal parent groups only)	8191	8191
ES2 10G Uplink LM (internal parent groups only)	8191	8191

Table 12: Policy and QoS Maximums Table continued

Feature	E120	E320
Parent groups (ingress) per line module		
ES2 4G LM	49,151	49,151
ES2 10G LM (internal parent groups only)	8191	8191
ES2 10G ADV LM (internal parent groups only	8191	8191
ES2 10G Uplink LM (internal parent groups only)	8191	8191
Software lookup blocks per line module		
ES2 4G LM	16,383	16,383
ES2 10G LM	16,383	16,383
ES2 10G ADV LM	32,000	32,000
ES2 10G Uplink LM	16,383	16,383
Secure policies (for packet mirroring)		
Per chassis	2400	2400
Per line module (See Note 3 on page 100.)	1022	1022

Tunneling Maximums

Table 13 lists tunneling maximums for the E120 router and the E320 router. The following notes are referred to in Table 13:

1. The ES2-S1 Service IOA supports any combination of DVMRP, GRE, and L2TP tunnels up to a maximum of 8000 tunnels; however, no more than 4000 tunnels can be DVMRP or GRE tunnels in any combination.
2. For more information about supported L2TP sessions and tunnels, see *JunosE Broadband Access Configuration Guide, Chapter 11, L2TP Overview*.

Table 13: Tunneling Maximums

Feature	E120	E320
DVMRP (IP-in-IP) tunnels per chassis	4000	4000
DVMRP (IP-in-IP) tunnels per line module with shared tunnel-server ports provisioned	4000	4000
DVMRP (IP-in-IP) tunnels per ES2-S1 Service IOA (See Note 1 on page 104.)	4000	4000
GRE tunnels per chassis	4000	4000
GRE tunnels per line module with shared tunnel-server ports provisioned	4000	4000
GRE tunnels per ES2-S1 Service IOA (See Note 1 on page 104.)	4000	4000
L2TP sessions per chassis (See Note 2 on page 104.)	60,000	60,000
L2TP sessions per line module with shared tunnel-server ports provisioned (See Note 2 on page 104.)	8000	8000
L2TP sessions per ES2-S1 Service IOA (See Note 2 on page 104.)	16,000	16,000
L2TP tunnels per chassis for SRP-100	16,000	16,000
L2TP tunnels per chassis for SRP-320 with ES2 4G LM	32,000	32,000
L2TP tunnels per line module with shared tunnel-server ports provisioned (See Note 2 on page 104.)	8000	8000

Table 13: Tunneling Maximums Table continued

Feature	E120	E320
L2TP tunnels per ES2-S1 Service IOA (See Note 1 and Note 2 on page 104.)	16,000	16,000

Subscriber Management Maximums

Table 14 lists subscriber management maximums for the E120 router and the E320 router. The following notes are referred to in Table 14:

1. DHCP relay proxy maintains a list of active DHCP clients up to a maximum of 100,000 clients per chassis for all virtual routers. DHCP relay does not maintain a list of DHCP clients.

   DHCP relay proxy is notified of DHCP client deletions and subsequently deletes the client's host routes. In contrast, DHCP relay is not notified of DHCP client deletions, so the host routes for deleted clients remain in DHCP relay until you permanently delete them with the **set dhcp relay discard-access-routes** command. A maximum of 100,000 host routes for DHCP clients can be stored for all DHCP relay and DHCP relay proxy instances (that is, for all virtual routers).

2. On the E120 router, the SRP-120 and the SRP-320 support a maximum of 64,000 interfaces.

   On the E320 router, the SRP-320 supports a maximum of 96,000 interfaces. The SRP-100 supports a maximum of 64,000 interfaces.

3. For DHCPv6 local server, up to 32,000 subscribers and clients are supported on PPP/ATM and PPPoE/ATM with dynamic interfaces. Interface flapping tests have been qualified for 8000 subscribers and interfaces.

Table 14: Subscriber Management Maximums

Feature	E120	E320
DHCP external server clients (per chassis for all virtual routers; and per virtual router) (See Note 1 on page 106.)	100,000	100,000
DHCP local server (See Note 2 on page 106.)		
Client bindings per chassis	96,000	96,000
Client interfaces per chassis	64,000	96,000
Local address pools per virtual router	4000	4000
IP addresses per local address pool	96,000	96,000
DHCPv6 local server		
Clients (See Note 3 on page 106.)	32,000	32,000
DHCP relay and relay proxy client (See Notes 1 and 2 on page 106.)		
DHCP client host routes for DHCP relay and DHCP relay proxy combined (per chassis for all virtual routers; and per virtual router)	100,000	100,000
DHCP relay proxy clients (per chassis for all virtual routers; and per virtual router)	100,000	100,000
Interfaces (per chassis for all virtual routers; and per virtual router)	64,000	96,000

Table 14: Subscriber Management Maximums Table continued

Feature	E120	E320
RADIUS requests		
Concurrent RADIUS authentication requests	32,000	32,000
Concurrent RADIUS accounting requests	32,000	96,000
RADIUS route-download server downloaded routes per chassis	64,000	96,000
Service Manager		
Service definitions	2048	2048
Service sessions (active)	196,608	262,144
Active subscriber sessions	64,000	96,000
SRC Software and SDX Software		
COPS client instances	200	200
SRC clients	200	200
SRC interfaces	48,000	96,000
Subscriber interfaces (See Note 2 on page 106.)		
Dynamic subscriber interfaces per chassis	64,000	96,000
Dynamic subscriber interfaces per ES2 4G LM	16,000	16,000
Dynamic subscriber interfaces per ES2 10G LM	16,000	16,000
Dynamic subscriber interfaces per ES2 10G ADV LM	32,000	32,000
Static subscriber interfaces per chassis	64,000	96,000
Static subscriber interfaces per ES2 4G LM	16,000	16,000
Static subscriber interfaces per ES2 10G LM	16,000	16,000
Static subscriber interfaces per ES2 10G ADV LM	32,000	32,000

Informational Note: The system maximum and line card maximum values mentioned in the tables are for single dimension scaling only. We recommend that you test scenarios which require scaling of multiple features to the maximum values concurrently, before deploying.
For example, on E320 routers we support 96,000 PPP subscribers and 1, 500, 000 BGP 4 routes (NLRI). These values are independent of each other. We recommend that you test if the system can concurrently support 96,000 PPP subscribers and 1,500,000 BGP 4 routes (NLRI), before deploying.

Appendix B

RADIUS VSA Formats

The information provided in this appendix supplements the Juniper Networks (Vendor ID 4874) VSA Formats table in *Chapter 6, RADIUS Attribute Descriptions* of the *JunosE Broadband Access Configuration Guide*.

Juniper Networks VSAs

Table 15 lists Juniper Networks VSA formats for RADIUS attributes numbered 26-101 through 26-105. JunosE Software uses the vendor ID assigned to Juniper Networks (vendor ID 4874) by the Internet Assigned Numbers Authority (IANA).

Table 15: Juniper Networks (Vendor ID 4874) VSA Formats

Attribute Number	Attribute Name	Description	Length	Subtype Length	Value
[26-101]	IP-Block-Multicast	Block all multicast traffic with a scope larger than link-local (for example, global) and prevent mroute creation under these conditions. This attribute does not affect reception of link-local multicast packets.	12	6	integer: 4-octet; 0 = disabled; 1 = enabled
[26-102]	IGMP-Explicit-Tracking	Enable or disable explicit host tracking for IPv4 IGMP interfaces. This option enables the router to explicitly track each individual host that is joined to a group or channel on a particular multi-access network.	12	6	integer: 4-octet; 0 = disabled; 1 = enabled
[26-103]	IGMP-No-Tracking-V2-Grps	Disable IGMP explicit host tracking for groups that contain IGMP V2 hosts. This attribute is valid only if IGMP V3 is enabled on the interface.	12	6	integer: 4-octet; 0 = disabled; 1 = enabled
[26-104]	MLD-Explicit-Tracking	Enable or disable explicit host tracking for IPv6 MLD interfaces. This option enables the router to explicitly track each individual host that is joined to a group or channel on a particular multi-access network.	12	6	integer: 4-octet; 0 = disabled; 1 = enabled
[26-105]	MLD-No-Tracking-V1-Grps	Disable MLD explicit host tracking for groups that contain MLD V1 hosts. This attribute is valid only if MLD V2 is enabled on the interface.	12	6	integer: 4-octet; 0 = disabled; 1 = enabled