

Release Notes: Junos[®] OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices

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Introduction

Junos OS Evolved is the next-generation Junos OS. It has the same CLI, the same features, and, in some cases, even the same processes as previous versions of Junos OS. However, its infrastructure is entirely modernized.

Use these release notes to find new and updated features, software limitations, and open issues for Junos OS Evolved Release 19.4R2.

These release notes are cumulative and are updated for later releases.

For more information on this release of Junos OS Evolved, see [Introducing Junos OS Evolved](#).

Junos OS Evolved Release Notes for PTX10003 Devices

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These release notes accompany Junos OS Evolved Release 19.4R2 for PTX10003 Packet Transport Routers. They describe new and changed features, limitations, and known and resolved problems in the hardware and software.

What's New

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Learn about new features introduced in Junos OS Evolved Release 19.4R2 for the PTX10003..

Hardware

- **Support for QDD-4X100G-FR transceivers**—Starting in Junos OS Evolved Release 19.4R2, the PTX10003 routers support the QDD-4X100G-FR transceivers.

[See the [Hardware Compatibility Tool](#).]

Class of Service (CoS)

- **Classification override configured under a forwarding policy (PTX10003-80C and PTX10003-160C)**—Starting in Junos OS Evolved Release 19.4R2, feature support for classification override configured under a forwarding policy is extended to PTX10003-80C and PTX10003-160C devices.

[See [Understanding Class of Service](#) and [Overriding the Input Classification](#).]

Dynamic Host Configuration Protocol (DHCP)

- **DHCP client (PTX10003)**—DHCPv4 and DHCPv6 for dynamic configuration of IP addresses on client interfaces, including management interfaces, is supported on PTX10003 routers.

[See [DHCP for Routing Devices](#).]

General Routing

- **View ARP table entries and IPv6 neighbor information (PTX10003-80C, PTX10003-160C, and QFX5220)**—Starting in Junos OS Evolved Release 19.4R2, you can view the following:
 - Address Resolution Protocol (ARP) details such as the next-hop reference count and the next-hop current state, using the commands **show arp reference-count** and **show arp state**.
 - IPv6 neighbor cache information, using the following commands: **show ipv6 neighbors flags**, **show ipv6 neighbors host**, **show ipv6 neighbors interface *interface-name***, **show ipv6 neighbors reference-count**, **show ipv6 neighbors vpn *vpn-name***.

[See [show arp](#) and [show ipv6 neighbors](#).]

High Availability and Resiliency

- **Resiliency application supports application-level restart (PTX10003-80C and PTX10003-160C)**—Starting in Junos OS Evolved Release 19.4R2, the resiliency application on the PTX10003 routers supports application-level restart, in case of failures. This feature ensures that a failure of the resiliency application such as crash or termination is handled gracefully without causing the entire platform to reboot.

[See [PTX10003 System Overview](#).]

- **Error management at the switch fabric level (PTX10003-80C and PTX10003-160C)**—Starting in Junos OS Evolved Release 19.4R2, the PTX10003 routers support the configuration of error scope, category, threshold, and corrective actions at the switch fabric level for the fabric errors. The PTX10003, being a fixed configuration chassis, does not have any physical switch fabric card that can be installed. Instead, it has two logical SIBs. The PTX10003 also supports multilevel fault actions for repeated faults—that is, to move the switch fabric (logical SIB) to the offline state when it is rebooted consecutively for three times within a time span of 900 seconds. The software supports a new error scope **switch** and an error category **internal**. All the errors from the fabric modules and a few errors from Packet Forwarding Engine are mapped to the internal category.

[See [error](#).]

Interfaces and Chassis

- **Support for LACP features (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, the PTX10003 supports LACP in the default periodic packet management (PPM) mode. The router supports the following LACP features:
 - LACP load balancing
 - OpenConfig
 - Telemetry
 - **Sync-reset** with minimum-link
 - LACP **force-up**
 - LACP **hold up**
- **Support for Layer 2 bridging (PTX10003)**—In Junos OS Evolved Release 19.4R2, PTX10003 routers support Layer 2 bridging. You create a bridge domain by adding a set of Layer 2 logical interfaces (on your device) to represent a broadcast domain. All the member ports of the bridge domain participate in Layer 2 learning and forwarding. You can configure one or more bridge domains to perform Layer 2 bridging. You can optionally disable learning on a bridge domain. You can configure the Layer 2 interfaces either by configuring the access and trunk port of the **ethernet-switching** family or by configuring **vlan-tagging**.

[See [Configuring Layer 2 Bridging Interfaces](#).]

- **Support for DCU accounting and SCU accounting (PTX10003 routers)**—Starting in Junos OS Evolved Release 19.4R2, destination class usage (DCU) accounting and source class usage (SCU) accounting are supported on PTX10003 routers. You can maintain packet counts based on the entry and exit points for traffic passing through your network. Entry and exit points are identified by source and destination prefixes grouped into disjoint sets, which are defined as source classes and destination classes. SCU counts packets sent to customers by performing lookups on the source IP address and the destination IP address. SCU accounting enables you to track traffic originating from specific prefixes on the provider core and destined for specific prefixes on the customer edge. DCU counts packets from customers by

performing lookups of the IP destination address. DCU accounting enables you to track traffic originating from the customer edge and destined for specific prefixes on the provider core router.

See [Understanding Source Class Usage and Destination Class Usage Options](#)

- **Support for resilient hashing (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, the PTX10003 supports resilient hashing by link aggregation groups (LAGs) and equal-cost multipath (ECMP) sets. Working together with the default static hashing algorithm, resilient hashing enhances LAGs and ECMP sets by minimizing destination remapping when a new member is added to or deleted from the LAG or ECMP set. When a flow is affected by a LAG member change, the Packet Forwarding Engine rebalances the flow by reprogramming the flow set table. Both consistent hash and resilient hash (on LAG) support only 64-way ECMP routing.

[See [Understanding Consistent Load Balancing Through Resilient Hashing on ECMP Groups.](#)]

- **PTX10003 DC power supply supports 60-A power source (PTX10003-80C and PTX10003-160C)**—Starting in Junos OS Evolved Release 19.4R2, the PTX10003 DC power supply supports a 60-A power source. If you choose the 60-A setting, the power supply limits its output power capacity to 2700 W at an input voltage of 48 V and linearly increases the output power if the input voltage increases. The power supply provides a maximum output of 3000 W at input voltage greater than 55 V, assuming 92 percent efficiency. If the voltage drops below 48 V but is above 40 V, the software raises a minor alarm **Input Under Voltage Warning** and reduces the output power capacity to 2200 W. The PSM is powered off if the voltage drops below 40 V.

[See [PTX10003 Power System.](#)]

Juniper Extension Toolkit (JET)

- **Support for ECMP path trace tool using APIs (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can use ECMP tracer JET APIs to monitor traffic flow, trace the ECMP path used by packets entering and exiting a CLOS network, and get flow counters without changing the configuration on your device. You provide match criteria to the ECMP path trace tool, `ecmptacerd`, through JET API requests. The `ecmptacerd` process then installs firewall filters for the inputs on all the interfaces on the device except the private interfaces. The counters associated with these filters increment as packets matching the firewall filter criteria arrive and leave. These APIs provide similar functionality to the `ecmp-tracer` on-box shell utility. Do not use the JET client and the `ecmp-tracer` on-box shell utility simultaneously.

[See [ecmp](#), [Juniper Extension Toolkit Developer Guide](#), and [Juniper Engineering Network website](#).]

Junos Telemetry Interface (JTI)

- **Support for gNMI services with JTI for Routing Engine and Packet Forwarding Engine sensors (PTX10003)**—Junos OS Evolved Release 19.1R1 introduced support to export the statistics using JTI and remote procedure call (gRPC) services. In Junos OS Evolved Release 19.4R2, you can also export statistics for these sensors using gRPC Network Management Interface (gNMI) services.

- Routing Engine internal interfaces (physical interface state and statistics) (resource path `/interfaces/`)
- Firewall filter counters and policer counters (resource path `/junos/system/linecard/firewall/`)
- Packet Forwarding Engine (resource path `/junos/system/linecard/packet/usage/`)
- NPU memory utilization statistics (resource path `/junos/system/linecard/npu/memory`)
- NPU utilization statistics (resource path `/junos/system/linecard/npu/utilization/`)

To provision the sensor to export data through gRPC services, use the **telemetrySubscribe** RPC.

To provision the sensor to export data through gNMI services, use the **Subscribe** RPC. The **Subscribe** RPC and subscription parameters are defined in the `gnmi.proto` file. Streaming telemetry data through gRPC or gNMI also requires the OpenConfig for Junos OS module.

[See [Guidelines for gRPC and gNMI Sensors \(Junos Telemetry Interface\)](#).]

- **JTI support for kernel statistics (PTX10003)**—Junos OS Evolved Release 19.4R2 supports Junos telemetry interface (JTI) sensors for Address Resolution Protocol (ARP/IPv4 routes), Network Discovery Protocol (NDP/IPv6 routes), and management interface statistics on PTX10003 routers. Statistics are delivered with gRPC Network Management Interface (gNMI) to stream statistics at regular intervals to an outside collector.

To stream statistics, include the resource paths in a subscription:

- Sensor for ARP statistics for IPv4 routes (resource path `/arp-information/`)
- Sensor for NDP table state information for IPv6 routes (resource path `/nd6-information/`)
- Sensor for management interface statistics (re0:mgmt-0) (resource path `/interfaces/interface/`)

To provision a sensor to export data through gNMI, use the **Subscribe** RPC defined in the `gnmi.proto` to specify request parameters.

[See [Guidelines for gRPC and gNMI Sensors \(Junos Telemetry Interface\)](#).]

Layer 2 Features

- **LLDP (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, LLDP is supported on PTX10003 routers, including on management interfaces. Disabling of LLDP time, length, and value (TLV) messages is also supported.

[See [Device Discovery Using LLDP and LLDP-MED on Switches](#).]

- **Support for basic Layer 2 features (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, PTX10003 routers support the following basic Layer 2 features:
 - Layer 2 bridging with trunk and access modes
 - MAC learning and aging
 - Handling broadcast, unknown unicast, and multicast (BUM) traffic, including split horizon

- Static MAC addresses
- MAC limiting
- Subinterface bridging
- Interface statistics

[See [Understanding Layer 2 Bridge Domains](#), and [Understanding Layer 2 Learning and Forwarding](#).]

- **Layer 2 features (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can configure the following Layer 2 features on the PTX10003 router:
 - Circuit cross-connect (CCC) with and without control word
 - Transport protocols in CCC
 - Layer 2 connection
 - Layer 2 circuit
 - Layer 2 VPN configuration with **ethernet-ccc** and **vlan-ccc** encapsulation types

The following Layer 2 features are not supported:

- Translational cross-connect (TCC)
- Layer 2 configuration with **flexible-ethernet-services** encapsulation type

[See [Layer 2 VPNs and VPLS Feature Guide for Routing Devices](#) and [Configuring Circuit Cross-Connect \(CCC\) and Translational Cross-Connect \(TCC\)](#).]

MPLS

- **RSVP and LDP point-to-multipoint LSPs (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can configure RSVP and LDP point-to-multipoint label-switched paths (LSPs) on the ingress, transit, egress, PHP, and bud interfaces of PTX10003 routers.

The following features are supported:

- RSVP-based point-to-multipoint LSPs
- Multicast LDP-based point-to-multipoint LSPs
- Point-to-multipoint LSP statistics

The following features are not supported:

- Point-to-multipoint LSP correlation
- Fast make-before-break (FMBB) protected Packet Forwarding Engine (PFE) support
- Point-to-multipoint LSP traceroute

- Virtual private LAN service (VPLS)
- Ethernet VPN (EVPN)

[See [Point-to-Multipoint LSPs Overview](#).]

Network Management and Monitoring

- **Support for running a Puppet agent as a Docker container (PTX10003-80C, PTX10003-160C, QFX5220-32CD, and QFX5220-128C)**—Starting in Junos OS Evolved Release 19.4R2, devices running Junos OS Evolved support running a Puppet agent as a Docker container. As an alternative to using the Puppet agent that is integrated into the Junos OS Evolved software image, you can use the Puppet agent Docker container provided by Juniper Networks. Using the container enables you to use standard Docker tools to manage the container and mount or unmount the Puppet agent as needed.

[See [Installing Puppet for Junos OS](#).]

- **Support for running a Chef client as a Docker container (PTX10003-80C, PTX10003-160C, QFX5220-32CD, and QFX5220-128C)**—Starting in Junos OS Evolved Release 19.4R2, devices running Junos OS Evolved support running a Chef client as a Docker container. As an alternative to using the Chef client that is integrated into the Junos OS Evolved software image, you can use the Chef client Docker container provided by Juniper Networks. Using a container enables you to use standard Docker tools to manage the container and mount or unmount the Chef client as needed.

[See [Deploying Chef for Junos OS](#).]

Port Security

- **Media Access Control Security (MACsec) enhancements (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, MACsec enhancements are supported on PTX10003 routers: preshared keychain and hitless key rollover, configurable EAP destination MAC address, and fallback key support. MACsec is an industry-standard security technology that provides secure communication for all traffic on point-to-point Ethernet links. MACsec is standardized in IEEE 802.1AE.

[See [Understanding Media Access Control Security \(MACsec\)](#).]

Routing Policy and Firewall Filters

- **MPLS LSP policer support (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can apply MPLS LSP policing on your PTX10003. Policing allows you to control the amount of traffic forwarded through a particular LSP and ensures that the amount of traffic forwarded through an LSP never exceeds the requested bandwidth allocation. The router supports automatic policing only on regular LSPs. Automatic policing allows you to provide strict service guarantees for network traffic. Such guarantees are especially useful in the context of Differentiated Services for traffic-engineered LSPs, providing better emulation for ATM wires over an MPLS network.

[See [Configuring MPLS Firewall Filters and Policers on Routers](#).]

Routing Protocols

- **BGP Prefix-Independent Convergence (PIC) edge support for inet and MPLS VPNs (PTX10003)**—Prefix-Independent Convergence (PIC) edge support is extended to BGP with multiple routes in the global tables such as inet and inet6 unicast, and inet and inet6 labeled unicast. When the BGP PIC feature is enabled on a router, BGP installs to the forwarding table the second-best path in addition to the calculated best path to a destination. When an IGP loses reachability to a prefix, the router uses this backup path to reduce traffic loss until the global convergence through BGP is resolved, thereby drastically reducing the outage duration.

You can also install a Layer 3 VPN route in the forwarding table as an alternate path, enabling fast failover when a provider edge (PE) router fails or you lose connectivity to a PE router. This already installed path is used until global convergence through the IGP is resolved.

To enable BGP PIC Edge in an MPLS VPN, include the **protect-core** statement at the **[edit routing-instances routing-instance-name routing-options]** hierarchy level. Both IS-IS LDP and OSPF LDP are supported. When BGP PIC Edge is enabled, the **show route extensive command** now displays the weight assigned to the indirect hop.

[See [Configuring BGP PIC Edge for MPLS Layer 3 VPNs](#), and [Use Case for BGP PIC for Inet](#)]

- **Inline BFD support (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, PTX10003 routers support inline BFD.

[See [Understanding BFD for Static Routes for Faster Network Failure Detection](#).]

- **Support for matching ip-options in IPv4 packet headers (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can use the **ip-options any** match condition to match fields in the IPv4 header and create firewall filter rules to handle the matched packets. Specifying **ip-options** provides a finer level of control, so for example, you can create a rule to drop any IPv4 packets that do not include at least one IP option in the header. Configure the match condition at the **[edit firewall family inet filter name term name from ip-options any]** hierarchy level.

[See [Firewall Filter Match Conditions for IPv4 Traffic](#).]

- **Support for the prefix-list match condition with apply-path option (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can use the **apply-path** statement to simplify the maintenance of group prefix lists used in policies and firewalls. When used, **apply-path** expands the scope of a given prefix list to include all prefixes based on the specified path. Enable the **apply-path** statement at the **[edit policy-options prefix-list name]** hierarchy level.

[See [apply-path](#).]

Services Applications

- **Support for real-time performance monitoring (RPM) (PTX10003)**—Starting with Junos OS Evolved Release 19.4R2, RPM sends out probes to the network to give a measure of network performance. The scope of support is limited to:
 - User configuration parsing for RPM
 - Probe generation and reception (client) as well as reflection (server) for the following RPM probe types:
 - icmp-ping probes
 - icmp-timestamp probes
 - udp-ping probes
 - udp-timestamp probes

Also supported are probe history management as well as reporting through syslog only.

[See [Understanding Using Probes for Real-Time Performance Monitoring on M, T, PTX and MX Series Routers.](#)]

Spanning-Tree Protocols

- **Spanning-Tree Protocol (STP), Rapid Spanning-Tree Protocol (RSTP), Multiple Spanning-Tree Protocol (MSTP), and VLAN Spanning-Tree Protocol (VSTP) support (PTX10003 devices)**—Starting in Junos OS Evolved Release 19.4R2, You can use STP, RSTP, MSTP, and VSTP to provide Layer 2 loop prevention.

[See [Spanning-Tree Protocol Overview.](#)]

System Management

- **sFlow support (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, sFlow technology supports the sampling and detecting of MPLS traffic on the PTX10003 router.

[See [Overview of sFlow Technology.](#)]

- **Passive monitoring support (PTX10003)**—Starting in Junos OS Evolved Release 19.4R2, you can enable passive monitoring on your PTX10003 so that any network interface can be configured as a passive monitoring interface. Passive monitoring provides filtering capabilities for monitoring ingress and egress traffic at the Internet point of presence (PoP) where security networks are attached. When you enable passive monitoring, the device accepts and monitors traffic on the interface and forwards the traffic to monitoring tools like IDS servers and packet analyzers, or other devices such as routers or end node hosts. To enable this feature, include the **passive-monitor-mode** statement at the **[edit interface]** hierarchy level.

[See [Understanding Passive Monitoring.](#)]

What's Changed

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Learn about what changed in Junos OS Evolved Release 19.4R2 for the PTX10003 .

Changes in CLI Statements and Commands

- To see the list of CLI statements and commands changed in Junos OS Evolved, see *How Junos OS Evolved Differs from Junos OS* in the [Introducing Junos OS Evolved Guide](#).

What's Changed in Junos OS Evolved Release 19.4R2-S1

Routing Protocols

- **Advertising /32 secondary loopback addresses to traffic engineering database as prefixes (PTX Series, QFX Series)**—We've made changes to export multiple loopback addresses to the `Isdist.0` and `Isdist.1` routing tables as prefixes. This eliminates the issue of advertising secondary loopback addresses as router IDs instead of prefixes. In earlier releases, multiple secondary loopback addresses in the traffic engineering database were added to the `Isdist.0` and `Isdist.1` routing tables as part of node characteristics and advertised them as the router ID.

What's Changed in Junos OS Evolved Release 19.4R2

Junos Telemetry Interface (JTI)

- **LLDP ON_CHANGE statistics support with JTI (PTX Series, QFX Series)**—Enhanced telemetry ON_CHANGE event support provides the following LLDP attributes:
 - When LLDP is enabled on interfaces, LLDP interface counters are notified along with other interface-level attributes.
 - ON_CHANGE event reports LLDP neighbor age and custom TLVs, as well as when a neighbor is initially discovered
 [See [Guidelines for gRPC and gNMI Sensors \(Junos Telemetry Interface\)](#).]

Network Management and Monitoring

- **Enhancement to the `show snmp mib` command**—Starting in Junos OS Evolved Release 19.4R2, a new option, `hex`, is supported to display the SNMP object values in the hexadecimal format. In earlier releases, the `show snmp mib` command displays the SNMP object values in ASCII and decimal format only.
[See [show snmp mib](#).]

Known Limitations

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Learn about limitations in this release for the PTX10003 . For the most complete and latest information about known Junos OS Evolved defects, use the Juniper Networks online [Juniper Problem Report Search](#) application.

General Routing

- Some XML tags for the **show system buffers** command are missing in Junos OS Evolved. [PR1429626](#)
- **zxchip_plct_counter_read(858): ZXCHIP handle NULL** errors are flooded after FPCs are taken offline. [PR1441340](#)
- The XML output of **show dhcp client binding | display xml** is different in Junos OS Evolved as compared to Junos OS. [PR1477983](#)

User Interface and Configuration

- This is a corner case with a workaround. The system is not clogged with stale users, but merely the messages coming when user enters configuration mode. This will not have any functional impact on the system. The issue will not be seen with the case of graceful reboot or a clean exit. Command **request system logout user *username* terminal pts/0** can be used to remove the stale user as a workaround. [PR1409851](#)
- In some cases, the command **request support information** might take more time to complete when journalctl gives a lot of boot messages as output. However, there is no impact on the functionality. [PR1449792](#)

Open Issues

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Learn about open issues in this release for the PTX10003 . For the most complete and latest information about known Junos OS Evolved defects, use the Juniper Networks online [Juniper Problem Report Search](#) application.

General Routing

- Packets sent with an incorrect IPv6 hop-by-hop type are not dropped. The same issue occurs with IPv4. [PR1403686](#)
- The messages **Em: root: route entry del failed, route does not exist prefix:0.0.0/24'** and **and 'Em: root: route entry del failed, route does not exist prefix:0.0.32/24** are seen after reverting to a baseline configuration. No action needs to be taken; the delete fails because the routes were never installed. This does not cause any issues. [PR1414028](#)
- In a scale scenario of million routes and thousands of LSPs, **show mpls lsp statistics** is slow due to high volume of route installation and statistics queries. [PR1416363](#)
- PTX10003-160C and PTX10003-80C: CoS aggregated Ethernet queue statistics for the **show interfaces queue ae0** CLI command are displayed as zero (whereas the rate, pps, and bps statistics are displayed correctly) after the **clear interfaces statistics all** command is issued and when one aggregated Ethernet member link flaps (24x10G ae0). [PR1423134](#)
- The XML tags for the CLI command **show version** are different in Junos OS Evolved as compared to Junos OS. [PR1429640](#)
- The XML tags for the **show interfaces**, **show interfaces terse**, and **show interfaces statistics** are different in Junos OS Evolved as compared to Junos OS. [PR1433459](#)
- The XML tags for **show system virtual-memory** are different in Junos OS Evolved as compared to Junos OS. [PR1438110](#)
- No application is detected during unified ISSU if the same application is in offline state in the base image. [PR1438686](#)
- For INET6 family, DSCP action is not supported for BGP Flowspec filters. If such a configuration is tried, INET6 family filtering does not happen for BGP flowspec rules. [PR1439366](#)
- With 3000 LSPs, about 500 ms of traffic loss is observed for Routing Engine driven local repair. [PR1459265](#)
- This can happen in negative test cases. When customer installs a yang package then configures a sensor and then deletes the yang package before deleting the sensor. [PR1470872](#)
- After deleting customized scheduler, default scheduler is applied but not working. Default scheduler can work with only default classifier. For default scheduler to work, please ensure default classifier is used and no traffic over unconfigured queues. [PR1476883](#)

- When shaper is configured on an output-queue using transmit-rate exact, it might not show the effect on the traffic flow. [PR1485486](#)
- Scheduler in StrictPriority mode, queue tx rate should not be affected by configured transmit-rate/remainder.

Infrastructure

- The following XML tags are missing in Junos OS Evolved for the **show route forwarding-table** CLI command:
 - *address-family*
 - *enabled-protocols*
 - *to*

[PR1429413](#)

Interfaces and Chassis

- For PTX10003-160C setup with all optics plugged in and all four PSMs operational, if somehow we incur a triple fault in PSM - 2 FPCs should go down due to insufficient power. However, in the process of that, the picd app might hang. This only occurs when the setup is a scaled condition with all or most of the optics plugged in. To recover from this condition, reboot the router. [PR1460185](#)
- Need configuration check during commit for port speed 400-Gigabit Ethernet or 100-Gigabit Ethernet configuration validation. [PR1461703](#)

Routing Policy and Firewall Filters

- If a filter term refers to prefix list as match-condition and the prefix list does not have any prefixes (directly configured or inherited through apply-path) in it, then such match-condition should be treated as "Match none" and none of the packets should hit that term. However, it might be treated as "Match any" in the code and the term might get hit if the packet satisfies other match conditions in the term.

User Interface and Configuration

- Restart of App cmd is failing with the following errors:
error: abnormal communication termination with command-handler daemon
error: the command-handler subsystem is not responding to management requests [PR1434409](#)

Resolved Issues

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Learn which issues were resolved in Junos OS Evolved Release 19.4R2 for the PTX10003.

For the most complete and latest information about known Junos OS Evolved defects, use the Juniper Networks online [Junos Problem Report Search](#) application.

Class of Service (CoS)

- A cosd core file is seen at CosRewriteRulesFCLossSniplet::populateOperObject when core profile configuration rollback is done to the base configuration. [PR1475637](#)
- The 32 DSCP classifier/rewrite functionality does not work after the cosd restart. [PR1479676](#)

General Routing

- The convergence time is of the order of 3508 ms for OSPF or IS-IS (50,000 routes scale, which is equivalent to 14,253 routes per second). In case of BGP, it is of the order of around 17,000 routes per second. [PR1379961](#)
- Operational and configuration CLIs changed. [PR1451455](#)
- System software issue where PSM firmware version is not refreshed after hot-plugging an updated PSM into the chassis. [PR1460409](#)
- Sometimes dhclient generates a core file during ZTP retry when the dhclient process is exiting. [PR1460906](#)
- Support information is not available in the **show system errors** CLI hierarchy. [PR1461691](#)
- Ports are in disabled State. Platform binding queue points to incomplete objects in evo-aftmand-zx with "Waiting usr inc : true" in one guid and also it can be recovered only by reboot. [PR1467546](#)
- Ping to an IPv6 logical interface fails after multiple triggers of an aggregated Ethernet member. [PR1472033](#)
- NPU memory/utlization sensor-show agent sensor is blank after the interface is deactivated or deleted. [PR1476886](#)
- After OIR feed to the PSM, PSM capacity gets stuck at 0 W capacity with output error in **show system alarm**. The system does not recover from this failure even after the **request system shutdown reboot** command is issued. [PR1477975](#)
- USB upgrade fails from Junos OS Evolved Release 19.3R2.1 to Junos OS Evolved Release 19.4R1.8. [PR1480371](#)

Interfaces and Chassis

- A 400-Gigabit Ethernet interface might take a longer time (about 50 seconds) to come up. [PR1450606](#)

MPLS

- In scenarios when multiple links in IS-IS are brought down and brought up again, LSPs might not come up. [PR1477780](#)

Network Management and Monitoring

- The mib2d generates a core file in jnxHrStorageEntry_get_value (lastmatch=< optimized out>, pktp=< optimized out>, vbp=0x7f1978e35a80, object=0x7f181564cd60) at ../../src/storage_mthd.cpp:357. [PR1475159](#)

User Interface and Configuration

- Publish-deleted is seen on object-info anomalies for “configd” during the firewall policy testing. [PR1486279](#)

Junos OS Evolved Release Notes for QFX5220 Devices

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These release notes accompany Junos OS Evolved Release 19.4R2 for QFX5220-32CD and QFX5220-128C Switches. They describe new and changed features, limitations, and known and resolved problems in the hardware and software.

What's New

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Learn about new features introduced in Junos OS Evolved Release 19.4R2 for the QFX5220.

Hardware

- **Support for QDD-400G-FR4 and QDD-400G-DR4 transceivers**—Starting in Junos OS Evolved Release 19.4R2, the QFX5220-32CD switches support the QDD-400G-FR4 and QDD-400G-DR4 transceivers.
[See the [Hardware Compatibility Tool](#).]

Class of Service (CoS)

- **Support for CoS/QoS features through 400-Gigabit Ethernet interfaces (PTX Series and QFX Series)**—Starting in Junos OS Evolved Release 19.4R2, support is provided for CoS/QoS features through 400-Gigabit Ethernet interfaces on PTX Series and QFX Series devices.
[See [Understanding Class of Service](#).]

Forwarding and Sampling

- **Customizing hashing parameters and shared-buffer alpha values for better load balancing (QFX5220)**—The QFX5220 switches achieve load balancing through the use of a hashing algorithm, which determines how to forward traffic over LAG bundles or to next-hop devices when ECMP is enabled.

Starting with Junos OS Evolved Release 19.4R2, you can explicitly configure some hashing parameters to make hashing more efficient. The shared-buffer pool is a global memory space that all ports on the switch share dynamically as they need buffers. The switch uses the shared-buffer pool to absorb traffic bursts after the dedicated-buffer pool is exhausted. The shared-buffer pool threshold is dynamically calculated based on a factor called alpha. You can also specify the alpha, or dynamic threshold, value to determine the change threshold of shared buffer pools for both ingress and egress buffer partitions.

To specify hashing parameters:

```
user@switch# set forwarding-options enhanced-hash-key hash-parameters (ecmp | lag)
```

To specify a threshold value for a particular queue:

```
user@switch# set class-of-service shared-buffer (ingress | egress) buffer-partition buffer
dynamic-threshold value
```

[See [hash-parameters](#) and [buffer-partition](#).]

Interfaces and Chassis

- **Support for dynamic load balancing (QFX5220)**—Starting in Junos OS Evolved Release 19.4R2, QFX5220 switches support dynamic load balancing (DLB) for ECMP. DLB is an enhancement to static load balancing. DLB considers member bandwidth utilization along with packet content for member selection.

You can use the following DLB modes to load-balance traffic:

- Flowlet
- Assigned flow
- Per-packet

To configure DLB for ECMP, include the **ecmp-dlb** statement at the **[edit forwarding-options enhanced-hash-key]** hierarchy level.

NOTE: You cannot configure both DLB and resilient hashing at the same time.

[See [Understanding Dynamic Load Balancing](#) and [Configuring Dynamic Load Balancing](#).]

Layer 2 Features

- **Spanning-Tree Protocol (STP), Rapid Spanning-Tree Protocol (RSTP), Multiple Spanning-Tree Protocol (MSTP), and VLAN Spanning-Tree Protocol (VSTP) support (QFX5220 switches)**—Starting in Junos OS Evolved Release 19.4R2, You can use STP, RSTP, MSTP, and VSTP to provide Layer 2 loop prevention.

[See [Spanning-Tree Protocol Overview](#).]

Multicast

- **Support for multicast forwarding (QFX5220-32CD and QFX220-128C)**—Starting with Junos OS Evolved Release 19.4R2, the following multicast features are supported:
 - IPv4 and IPv6 multicast
 - Internet Group Management Protocol (IGMP)
 - Multicast Listener Discovery (MLD)
 - PIM source-specific multicast (PIM SSM)
 - PIM sparse mode (PIM SM)

In this release, IGMP snooping, MLD snooping, MVPN, PIM MoFRR, PIM first hop router, rendezvous point (RP), and last hop router are not supported.

[See [Multicast Routing Protocols](#).]

Network Management and Monitoring

- **Support for running a Puppet agent as a Docker container (PTX10003-80C, PTX10003-160C, QFX5220-32CD, and QFX5220-128C)**—Starting in Junos OS Evolved Release 19.4R2, devices running Junos OS Evolved support running a Puppet agent as a Docker container. As an alternative to using the Puppet agent that is integrated into the Junos OS Evolved software image, you can use the Puppet agent Docker container provided by Juniper Networks. Using the container enables you to use standard Docker tools to manage the container and mount or unmount the Puppet agent as needed.

[See [Installing Puppet for Junos OS](#).]

- **Support for running a Chef client as a Docker container (PTX10003-80C, PTX10003-160C, QFX5220-32CD, and QFX5220-128C)**—Starting in Junos OS Evolved Release 19.4R2, devices running Junos OS Evolved support running a Chef client as a Docker container. As an alternative to using the Chef client that is integrated into the Junos OS Evolved software image, you can use the Chef client Docker container provided by Juniper Networks. Using the container enables you to use standard Docker tools to manage the container and mount or unmount the Chef client as needed.

[See [Deploying Chef for Junos OS](#).]

Routing Policy and Firewall Filters

- **Support for 2000 egress firewall filters (QFX5220)**—Starting in Junos OS Evolved Release 19.4R2, you can configure up to 2000 VLAN firewall filters on the QFX5220 switch. This feature is supported only in the egress direction (traffic exiting the VLAN). To configure, include the **egress-scale** option under the **eracl-profile** statement at the **[edit system packet-forwarding-options firewall]** hierarchy level.

[See [eracl-profile](#) and [Configuring Firewall Filters](#).]

Spanning-Tree Protocols

- **Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), and VLAN Spanning Tree Protocol (VSTP) support (QFX5220)**—Starting in Junos OS Evolved Release 19.4R2, you can use STP, RSTP, MSTP, and VSTP to provide Layer 2 loop prevention.

[See [Spanning Tree Protocol Overview](#).]

System Management

- **Boundary clock and enterprise profile support for Precision Time Protocol (PTP) (QFX5220)**—Starting in Junos OS Evolved Release 19.4R2, the enterprise profile, which is based on PTPv2, provides the ability for enterprise and financial markets to timestamp on different systems and to handle a range of latency and delays.

The enterprise profile supports the following options:

- IPv4 multicast transport
- Boundary clocks
- 512 downstream slave clocks

You can enable the enterprise profile at the **[edit protocols ptp profile-type]** CLI hierarchy level.

[See [Understanding the Precision Time Protocol Enterprise Profile.](#)]

What's Changed

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- [What's Changed in Junos OS Evolved Release 19.4R2 | 27](#)

Learn about what changed Junos OS Evolved Release 19.4R2 for QFX5220-32CD and QFX5220-128C switches.

What's Changed in Junos OS Evolved Release 19.4R2-S1

Routing Protocols

- **Advertising /32 secondary loopback addresses to traffic engineering database as prefixes (PTX Series, QFX Series)**—We've made changes to export multiple loopback addresses to the `Isdist.0` and `Isdist.1` routing tables as prefixes. This eliminates the issue of advertising secondary loopback addresses as router IDs instead of prefixes. In earlier releases, multiple secondary loopback addresses in the traffic engineering database were added to the `Isdist.0` and `Isdist.1` routing tables as part of node characteristics and advertised them as the router ID.

What's Changed in Junos OS Evolved Release 19.4R2

Junos Telemetry Interface (JTI)

- **LLDP ON_CHANGE statistics support with JTI (PTX Series, QFX Series)**—Enhanced telemetry ON_CHANGE event support provides the following LLDP attributes:
 - When LLDP is enabled on interfaces, LLDP interface counters are notified along with other interface-level attributes.
 - ON_CHANGE event reports LLDP neighbor age and custom TLVs, as well as when a neighbor is initially discovered

[See [Guidelines for gRPC and gNMI Sensors \(Junos Telemetry Interface\)](#).]

Known Limitations

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Learn about known behavior in Junos OS Evolved Release 19.4R2 for the QFX5220. For the most complete and latest information about known Junos OS Evolved defects, use the Juniper Networks online [Junos Problem Report Search](#) application.

Interfaces and Chassis

- Using **show interfaces** to view traffic statistics does not show any traffic statistics for IPv6. [PR1421685](#)

MPLS

- The maximum number of transit MPLS LSPs supported in QFX5220-32CD and QFX5220-128C switches is 16000. But depending on hash collisions, packet drops might be seen with more than 14,000 LSPs. [PR1472100](#)

User Interface and Configuration

- In some cases, the command **request support information** might take more time to complete when `journalctl` gives a lot of boot messages as output, but functionality-wise there is no impact. [PR1449792](#)

Open Issues

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Learn about open issues in this release for the QFX5220. For the most complete and latest information about known Junos OS Evolved defects, use the Juniper Networks online [Juniper Problem Report Search](#) application.

Class of Service (CoS)

- On QFX5220 platform running Junos OS Evolved, the CLI output of **show class-of-service scheduler-map smap** changed from Junos OS Evolved releases 19.2 to 19.4. [PR1487189](#)

Infrastructure

- The following XML tags are missing in Junos OS Evolved for the **show route forwarding-table** command:
 - *address-family*
 - *enabled-protocols*
 - *to*

[PR1429413](#)

Interfaces and Chassis

- The **show chassis in-service-upgrade** and **show chassis nonstop-upgrade** CLI commands are not applicable to Junos Evolved Release 19.4R2. [PR1425575](#)
- On multiple commits and rollback, there is a possibility that some physical interfaces are not created. As a workaround, one can restart the Pfemand application: **cli> request system application app evo-pfemand restart node re0** . [PR1482912](#)

Platform and Infrastructure

- The XML tags for **show system virtual-memory** are different in Junos OS Evolved as compared to Junos OS.
- On QFX5220-128C platform, egress traffic might fail on any of the 10G channelized interfaces after channelization configuration or after a reboot. Multiple deletions and additions of AE and its member interfaces occasionally causes the port VLAN IDs of some of the member interfaces to reset to default value. [PR1452493](#)
- For QFX5220-128C, traffic not is working for VLAN ID 1 with IRB configuration. [PR1454468](#)
- On QFX5220-128C platform, random 10-Gigabit Ethernet channelized interfaces might not come up after reboot or after committing AE or MTU configuration changes. [PR1485263](#)

System Management

- A QFX5220 switch might fail during an upgrade from Junos OS Evolved 19.3R2.1 to Junos OS Evolved 19.4-202002240046.0 or later releases due to **clksyncd** failure. [PR1491803](#)

User Interface and Configuration

- Restart of App cmd is failing with the following errors:
error: abnormal communication termination with command-handler daemon
error: the command-handler subsystem is not responding to management requests [PR1434409](#)

Resolved Issues

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Learn which issues were resolved in Junos OS Evolved Release 19.4R2 for the QFX5220. For the most complete and latest information about known Junos OS Evolved defects, use the Juniper online [Junos Problem Report Search](#) application.

Interfaces and Chassis

- Physical interface statistics retain old values after statistics are cleared and interfaces are deactivated and reactivated. [PR1403606](#)
- A 400-Gigabit Ethernet interface might take a longer time (about 50 seconds) to come up. [PR1450606](#)

Routing Policy and Firewall Filters

- Lo0 firewall filter might affect Layer 3 forwarding traffic on QFX5220 platforms. [PR1475620](#)

Routing Protocols

- SFTP does not connect properly. The following error is displayed: **Received message too long.** [PR1475255](#)

Network Management and Monitoring

- On platforms running Junos OS Evolved, multiple syslog servers are not being configured on the device when multiple syslog servers are configured on the DHCP server. [PR1458931](#)

System Management

- PTP-FPGA access error printed because PTP-FPGA is not initialized. [PR1457094](#)
- Sometimes dhclient generates a core file during ZTP retry when the dhclient process is exiting. [PR1460906](#)
- Output **1PPS and 10MHz** measurement ports on QFX5220-32CD are not fully available. [PR1464452](#)
- The timingd process generates a core file rarely after a switch reboot. [PR1464493](#)
- High CPU consumption is seen when a scaled VLAN configuration having 3965 VLANs is committed for 30 minutes. [PR1474374](#)
- QFX5220-128C: INPHI firmware upgrade requires power cycling. [PR1477124](#)

Upgrade your Junos OS Evolved Software

Products impacted: PTX10003, QFX5220-32CD, and QFX5220-128C.

Follow these steps to upgrade your Junos OS Evolved software:

1. Using a Web browser, navigate to the **All Junos Platforms** software download URL on the Juniper Networks webpage:
<https://www.juniper.net/support/downloads/>
2. In the **Find a Product** box, enter the Junos OS platform for the software that you want to download.
3. Select **Junos Evolved** from the OS drop-down list.
4. Select the relevant release number from the **Version** drop-down list.
5. In the **Install Package** section, select the software package for the release.
6. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by a Juniper Networks representative.
7. Review and accept the End User License Agreement.
8. Download the software to a local host.

NOTE: Download the Services Profile 1 image to use the lean rpd profile.

For more information about the types of Junos OS installation package prefixes, see [Installation Packages Prefixes](#).

9. Copy the software to the device or to your internal software distribution site.
10. Install the new package on the device.

NOTE: We recommend that you upgrade all software packages out of band using the console because in-band connections are lost during the upgrade process.

For more information about software installation and upgrade, see [Software Installation and Upgrade Overview](#).

For more information about EOL releases and to review a list of EOL releases, see <https://support.juniper.net/support/eol/software/junosevo/>.

Finding More Information

Learn about more information on Junos OS Evolved and other Juniper products.

- Feature Explorer—The Juniper Networks Feature Explorer is a Web-based app that helps you to explore and compare Junos OS and Junos OS Evolved feature information to find the right software release and hardware platform for your network. <https://pathfinder.juniper.net/feature-explorer/>
- PR Search Tool—Keep track of the latest and additional information about Junos OS Evolved open defects and issues resolved. prsearch.juniper.net
- Hardware Compatibility Tool—Determine optical interfaces and transceivers supported across all platforms. apps.juniper.net/hct/home

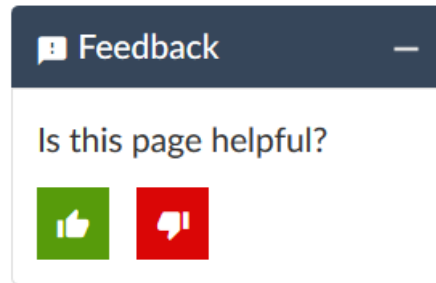
NOTE: To obtain information about the components that are supported on the devices, and the special compatibility guidelines with the release, see the Hardware Guide for the product.

- Juniper Networks Compliance Advisor—Review regulatory compliance information about Common Criteria, FIPS, Homologation, RoHS2, and USGv6 for Juniper Networks products. apps.juniper.net/compliance/

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

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 Partner Support Service 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 <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.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: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes: <https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://entitlementsearch.juniper.net/entitlementsearch/>

Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit <https://myjuniper.juniper.net>.
- 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, see <https://support.juniper.net/support/requesting-support/>.

Revision History

13 January 2021—Revision 6, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

30 July 2020—Revision 5, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

16 July 2020—Revision 5, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

30 April 2020—Revision 4, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

23 April 2020—Revision 3, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

16 April 2020—Revision 2, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

6 April 2020—Revision 1, Junos OS Evolved Release 19.4R2 for the PTX10003 and QFX5220 Devices.

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