

Junos[®] OS Release 15.1X54–D25 Release Notes

Release 15.1X54–D25
25 February, 2016
Revision 1

These release notes accompany Release 15.1X54–D25 of the Junos operating system (Junos OS) for Juniper Networks ACX5000 Universal Access Routers. They describe device documentation and known problems with the software. Junos OS runs on all ACX Series routers.

For the latest, most complete information about outstanding and resolved issues with the Junos OS software, see the Juniper Networks online software defect search application at <http://www.juniper.net/prsearch>.

You can also find these release notes on the Juniper Networks Junos OS Documentation Web page, which is located at <https://www.juniper.net/techpubs/software/junos/>.

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Junos OS Release Notes for ACX Series Routers

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New Features in Junos OS Release 15.1X54–D25 for ACX Series Routers

Powered by Junos OS, the ACX5000 Universal Access Routers are low-cost, high-density, high-capacity, low-power consumption aggregation routers that support 1-Gigabit Ethernet, 10-Gigabit Ethernet, and 40-Gigabit Ethernet interfaces and provide E-LINE, E-LAN, and IP-VPN services for Metro and Carrier Ethernet aggregation environments.

The following features have been added to Junos OS Release 15.1X54–D25 for the ACX5000 line of universal access routers. Following the description is the title of the manual or manuals to consult for further information:

- [Hardware on page 3](#)
- [Software on page 4](#)

Hardware

- **New ACX5000 Universal Access Routers**—Starting in Release 15.1X54–D25, Junos OS supports the ACX5000 Universal Access Routers (model numbers: ACX5048-AC, ACX5048-DC, ACX5096-AC, ACX5096-DC). The ACX5000 routers are high-capacity and low-cost aggregation routers best suited for Metro and Carrier Ethernet Aggregation deployments. The ACX5000 routers are available in AC and DC power variants.

The following are the key features of the ACX5048 router:

- Forty-eight 10-Gigabit Ethernet SFP+ ports that can be configured as 1-Gigabit Ethernet ports that support 1-gigabit small form-factor pluggable transceivers (SFP)
- Six 40-Gigabit Ethernet ports with quad form-factor pluggable plus transceivers (QSFP+)
- Aggregate throughput of up to 1.44 Tbps
- Maximum power requirement of up to 350 W (with optical SFPs)
- Supports channelized 10-Gigabit Ethernet interfaces



NOTE: You can configure one 40-Gigabit Ethernet interface to be channelized into four 10-Gigabit Ethernet interfaces.

The following are the key features of the ACX5096 router:

- Ninety-six 10-Gigabit Ethernet SFP+ ports that can be configured as 1-Gigabit Ethernet ports and support 1-gigabit small form-factor pluggable transceivers (SFP)
- Eight 40-Gigabit Ethernet ports with quad form-factor pluggable plus transceivers (QSFP+)
- Aggregate throughput of up to 2.56 Tbps
- Maximum power requirement of up to 550 W (with optical SFPs)
- Supports channelized 10-Gigabit Ethernet interfaces



NOTE:

- You can configure one 40-Gigabit Ethernet interface to be channelized into four 10-Gigabit Ethernet interfaces.
- When channelizing the 40-Gigabit Ethernet interfaces on the ACX5096 router, the router's Packet Forwarding Engine is expected to reboot.
- ACX5048 and ACX5096 routers do not support 10 Mbps and 100 Mbps speed on copper SFP ports.

Software

- **Support for automatic bandwidth allocation for label-switched paths (LSPs)**—Starting in Release 15.1X54-D25, Junos OS for ACX5000 Universal Access Routers supports automatic bandwidth allocation for LSPs. Automatic bandwidth allocation allows an MPLS tunnel to automatically adjust its bandwidth allocation based on the volume of traffic flowing through the tunnel. You can configure an LSP with minimal bandwidth, and this feature can dynamically adjust the LSP's bandwidth allocation based on current traffic patterns. The bandwidth adjustments do not interrupt traffic flow through the tunnel.

To enable automatic bandwidth allocation on an LSP, include the **auto-bandwidth** CLI statement at the `[edit protocols mpls]` hierarchy level.

`[edit protocols mpls]`

```

auto-bandwidth {
  adjust-interval seconds;
  adjust-threshold percent;
  adjust-threshold-activate-bandwidth bps;
  adjust-threshold-overflow-limit number;
  adjust-threshold-underflow-limit number;
  maximum-bandwidth bps;
  minimum-bandwidth bps;
  minimum-bandwidth-adjust-interval;
  minimum-bandwidth-adjust-threshold-change;
  minimum-bandwidth-adjust-threshold-value;
  monitor-bandwidth;
}

```

To collect statistics related to automatic bandwidth, include the **auto-bandwidth** CLI statement at the `[edit protocols mpls statistics]` hierarchy level.

`[edit protocols mpls]`

```
statistics {
  auto-bandwidth;
  file filename <files number> <size size> <world-readable | no-world-readable>;
  interval seconds;
  no-transit-statistics;
  traffic-class-statistics;
  transit-statistics-polling;
}
```

- **Support for tri-rate small form-factor pluggable transceiver (SFP)**—Starting in Release 15.1X54-D25, Junos OS for ACX5000 Universal Access Routers supports 10 Mbps, 100 Mbps and 1 Gbps speeds for SFP-FE-ET model.

To configure the speed on the interfaces with these tri-rate SFPs, include the **speed** CLI statement at the `[edit interfaces interface-name]` hierarchy level. Auto speed not supported in ACX5000 Series routers.

To verify the speed set for a configured interface, use the **show interfaces *interface-name* extensive | grep speed** command.

The following is a sample output for **show interfaces *interface-name* extensive | grep speed** command:

```
Link-level type: Ethernet, MTU: 9192, LAN-PHY mode, Link-mode: Full-duplex,
Speed: 100mbps, BPDU Error: None,
Link mode: Full-duplex, Flow control: Symmetric/Asymmetric, Remote fault: OK,
Link partner Speed: 100 Mbps
```

Related Documentation

- [Known Limitations in Junos OS Release 15.1X54-D25 for ACX Series Routers on page 5](#)
- [Upgrade and Downgrade Instructions for Junos OS Release 15.1X54-D25 for ACX Series Routers on page 12](#)

Known Limitations in Junos OS Release 15.1X54-D25 for ACX Series Routers

The following software limitations currently exist in Juniper Networks ACX Series Universal Access Routers. The identifier following the descriptions is the tracking number in the Juniper Networks Problem Report (PR) tracking system.

Interfaces and Chassis

- The counters for oversized frames and jabber frames does not increment properly. This happens in the case of a tagged interface for a packet size between 1519 and 1522 bytes. [[PR1060169](#): This is a known limitation.]
- A commit error is not seen while configuring channelization in the following scenario:

If you configure channelization on a port, the configuration should throw a commit error when the channelization on the port is configured individually and as well as configured as a part of port-range as shown below:

```
[edit chassis]
fpc 0 {
  pic 0 {
    port 53 {
      channel-speed 10g;
    }
    port 54 {
      channel-speed 10g;
    }
    port-range 53 54 {
      channel-speed 10g;
    }
  }
}
```

[[PR1051245](#): This is a known limitation.]

- On ACX5000 Series router, if you configure an interface and set the speed as auto or is left as default and if the speed on the peer router is set as 100m, the interface between these routers will not come up. The workaround is to configure the same speed on both the routers. [[PR1087544](#): This is a known limitation.]

Class of Service

- When the **show class-of-service scheduler-map** CLI command is run, the output does not show the drop profiles attached to a non-TCP traffic. Drop profiles attached to only TCP traffic are displayed. [[PR1048408](#): This is a known limitation.]
- Weighted random early detection (WRED) profiles do not have any effect on multicast, unknown unicast, broadcast, and mirrored packets. WRED profiles affect only queue tail drops.
- ACX5048 and ACX5096 routers do not support DSCP classification for MPLS packets received from core on routing instance configured with BGP for per-prefix-label.
- On ACX5048 and ACX5096 routers, whenever scheduler parameters are changed while the traffic is flowing with shaping applied, the entire traffic on the egress physical interface is blocked temporarily.
- On ACX5000 Series routers, if you configure the **vlan-id-list** encapsulation on CCC family-based logical interfaces along with **connection-protection**, the **connection-protection** functionality will not work.

The **connection-protection** functionality will also not work when **native-vlan-id** is configured. [[PR1159637](#): This is a known limitation.]

VPN

- When the router restores from fast reroute (FRR) link failures, less than 1 millisecond traffic loss is seen on few Layer 3 VPNs. [[PR1017210](#): This is a known limitation.]

VPLS

- When the **show vpls statistics** CLI command is run, the statistics for various output fields show value as 0. [[PR1057240](#): This is a known limitation.]
- The **ping vpls** CLI command is not supported on ACX5048 and ACX5096 routers. [[PR1065202](#): This is a known limitation.]
- The shaping rate for VPLS flood cases with bidirectional traffic does not work correctly. [[PR1078664](#): This is a known limitation.]
- When a VLAN tagged traffic is sent on a logical interface with Ethernet-VPLS encapsulation configured, only single VLAN tagged traffic is received instead of dual tagged traffic. This occurs when you configure Ethernet-VPLS encapsulation and VLAN-VPLS encapsulation on logical interfaces that are part of a VPLS routing instance configured with `vlan-id none`. [[PR1100255](#): This is a known limitation.]

Firewall

- When you configure firewall on a logical interface with **native-vlan-id** configured, the configuration might erroneously match the traffic on other logical interfaces on the same physical interface. [[PR1048860](#): This is a known limitation.]

Operations Administration and Maintenance

- Customer edge (CE-to-CE) link fault management (LFM) session does not come up on circuit cross-connect (CCC) logical interface configured with **native-vlan** and input (push-pop) VLAN map operation. [[PR1044997](#): This is a known limitation.]
- When a bridge domain interface is configured with explicit VLAN map (input or output), maintenance association intermediate point (MIP) cannot be configured. [[PR1058393](#): This is a known limitation.]
- If you make any changes to the COS configuration after the CFM (OAM) session is up then those changes will not have any effect on the CCM (OAM) packets generated from the device. The workaround is to deactivate and activate the OAM protocol for the COS configuration changes to take effect. [[PR1054908](#): This is a known limitation.]
- On ACX5000 Series router, when you initiate an on-demand delay measurement, or an iterator-based delay measurement, the values recorded in certain delay measurement response (DMR) messages are high. [[PR1115212](#): This is a known limitation.]

Transparent Clock

- When transparent clock is configured in the router and when the router resumes after reboot, the transparent clock status is shown as **ENABLED** and **ACTIVE**, instead of **ENABLED** and **INACTIVE**. This condition is transient and has no functional impact.

```
user@host# run show ptp global-information
PTP Global Configuration:
Transparent-clock-config : ENABLED
Transparent-clock-status : ACTIVE
```

[[PR1051500](#): This is a known limitation.]

- When you run the **restart clksyncd-service** CLI command, incorrect correction field values are seen when transparent clock is **INACTIVE**. This does not have any functional impact. [[PR1067583](#): This is a known limitation.]
- When transparent clock is in **ENABLED** or **DISABLED** state and if you try to add, delete, or modify any of the interfaces, the transparent clock **ENABLED** or **DISABLED** messages are seen in the packet forwarding engine (PFE). This does not have any functional impact. [[PR1069516](#): This is a known limitation.]
- On ACX5000 Series routers, whenever you delete the configuration for transparent clock, the transparent clock functionality does not get disabled on the router. The workaround is to reboot the router. [[PR1140710](#): This is a known limitation.]

Messages

- The following error message is seen whenever the PFE is restarted:

```
LOG: Err] PORTDEV: OPTIC State changed for port
```

This does not have any functional impact. [[PR1066899](#)]

- The following error message is seen in the PFE when **firewall family ccc filter** scale is reached:

```
LOG: Info] ipc_pipe_write_wait(): Failed! (broken pipe)
```

This does not have any functional impact. [[PR1098169](#)]

- The following error message is seen in the PFE when you delete the pseudowire with scale:

```
LOG: Err] acx_bcm_mpls_nni_port_delete: port stat ctr get failed VPN:12295
mpls_gport:402657148 (-7:Entry not found)
```

This does not have any functional impact. [[PR1096405](#)]

- The following error message is seen when multiple MPLS service scale configuration is replaced with another multiple MPLS service scale configuration:

```
LOG: Err] ACX_NH::acx_nh_mpls_tunnel_uninstall(),1142:acx_nh_mpls_tunnel_uninstall:
BCM L3 Egress destroy object failed for (-10:Operation still running),
BCM NH Obj: 0x1875a
```

This does not have any functional impact. [[PR1093326](#)]

- An error message is seen when aggregated Ethernet interface configuration is removed from the VPLS service. This does not have any functional impact. [[PR1090923](#)]
- The following messages are seen when the MPLS label-switched path (LSP) configurations are removed at scale:

```
LIBJSNMP_NS_LOG_NOTICE: NOTICE: Dropping Trap - Defer send disabled
```

This does not have any functional impact. [[PR1077913](#)]

- On ACX5000 series routers, when you have MLDv2 multicast groups at scale, the following error messages are seen due to occasional hash collisions:

```
IPv6 Multicast Prefix 255:3:0:0:0:0:0:0:0:0:0:0:0:0:23:3:224
[Tue Nov 10 11:10:56.227 LOG: Err]
prefixbyte = 32, prefixlen =256
[Tue Nov 10 11:10:56.227 LOG: Err]
acx_rt_ip_mc_entry_install vrf:1 rt:ff03:0:0:0:0:17:3e0:2001:db8:0:5::17:2/256 action:0
Err: ipmc add failed (0:Ok) 1000
[Tue Nov 10 11:10:56.227 LOG: Err] Failed to h/w update ip mc route entry (status:
1000)
[Tue Nov 10 11:10:56.227 LOG: Err] Failed to install the RT entry (status: 1000)
[Tue Nov 10 11:10:56.227 LOG: Err] RT-HAL,rt_entry_add_msg_proc,3390:
rt_halp_vectors->rt_create failed
[Tue Nov 10 11:10:56.228 LOG: Err] RT-HAL,rt_entry_add_msg_proc,3451: proto ipv6,len
256 prefix ff03:0:0:0:0:0:17:3e0:2001:db8:0:5::17:2/256 nh 131138
[Tue Nov 10 11:10:56.228 LOG: Err] RT-HAL,rt_msg_handler,688: route process failed
```

[[PR1138545](#)]

- Whenever an AE-based pseudowire flaps, the following messages are seen:

```
Jul 2 14:37:14 acx5k11-dc fpc0
ACX_COS_HALP(acx_cos_classifier_type_bind_svp:2218): Classifier bind to IFL 559
failed
Jul 2 14:42:52 acx5k11-dc fpc0
ACX_COS_HALP(acx_cos_bind_classifier_dscp_ifl_pvt:2288): bcm_port_dscp_map_set()
API ERROR : Entry not found
```

This does not have any functional impact. [[PR1102004](#): This is a known limitation.]

Related Documentation

- [New Features in Junos OS Release 15.1X54–D25 for ACX Series Routers on page 3](#)
- [Upgrade and Downgrade Instructions for Junos OS Release 15.1X54–D25 for ACX Series Routers on page 12](#)

Errata and Changes in Documentation for Junos OS Release 15.1X54-D25 for ACX Series Routers

- [Errata on page 9](#)
- [Changes to the Junos OS ACX Documentation on page 11](#)

Errata

- Support for multifield classifiers is incorrectly omitted from the ACX Series documentation. Multifield classifiers allow fine grained classification by examination of multiple fields in the packet header—for example, the source and destination address

of the packet, and the source and destination port numbers of the packet. A multifield classifier typically matches one or more of the six packet header fields: destination address, source address, IP protocol, source port, destination port, and DSCP. Multifield classifiers are used when a simple BA classifier is insufficient to classify a packet.

In the Juniper Networks Junos operating system (Junos OS), you configure a multifield classifier with a firewall filter and its associated match conditions. This enables you to use any filter match criteria to locate packets that require classification. From a CoS perspective, multifield classifiers (or firewall filter rules) provide the following services:

- Classify packets to a forwarding class and loss priority. The forwarding class determines the output queue. The loss priority is used by schedulers in conjunction with the random early discard (RED) algorithm to control packet discard during periods of congestion.
- Police traffic to a specific bandwidth and burst size. Packets exceeding the policer limits can be discarded, or can be assigned to a different forwarding class, to a different loss priority, or to both.



NOTE: You police traffic on input to conform to established CoS parameters, setting loss handling and forwarding class assignments as needed. You shape traffic on output to make sure that router resources, especially bandwidth, are distributed fairly. However, input policing and output shaping are two different CoS processes, each with their own configuration statements.

To configure multifield classifiers, include the following statements at the [edit firewall] hierarchy level:

```
[edit firewall]
family family-name {
  filter filter-name {
    term term-name {
      from {
        match-conditions;
      }
      then {
        dscp 0;
        forwarding-class class-name;
        loss-priority (high | low);
      }
    }
  }
}
simple-filter filter-name {
  term term-name {
    from {
      match-conditions;
    }
    then {
      forwarding-class class-name;
      loss-priority (high | low | medium);
    }
  }
}
```

```

    }
}

```

The minimum configuration required to define a multifield classifier is the following:

```

[edit firewall]
family family-name {
  simple-filter filter-name {
    term term-name {
      then {
        forwarding-class class-name;
        loss-priority (high | low | medium);
      }
    }
  }
}

```

After defining the multifield classifier, you can apply the multifield classifier to an individual interface with the following configuration:

```

[edit interfaces]
interface-name{
  unit logical-unit-number{
    family family {
      filter {
        input filter-name;
      }
    }
  }
}

```

[ACX Series Universal Access Router Configuration Guide]

- The *Configuring Load Balancing Based on MPLS Labels on ACX Series Routers* topic fails to explicitly state that load balancing using MPLS labels is supported only for aggregated Ethernet (ae) or LAG interfaces and not for equal-cost multipath (ECMP) links. To load-balance based on the MPLS label information for LAG interfaces, configure the **family mpls** statement at the [edit forwarding-options hash-key] hierarchy level.

[ACX Series Universal Access Router Configuration Guide]

Changes to the Junos OS ACX Documentation

There are no changes to the ACX Documentation in Junos OS Release 15.1X54-D25.

Related Documentation

- [New Features in Junos OS Release 15.1X54-D25 for ACX Series Routers on page 3](#)
- [Known Limitations in Junos OS Release 15.1X54-D25 for ACX Series Routers on page 5](#)
- [Upgrade and Downgrade Instructions for Junos OS Release 15.1X54-D25 for ACX Series Routers on page 12](#)

Upgrade and Downgrade Instructions for Junos OS Release 15.1X54-D25 for ACX Series Routers

This section discusses the following topics:

- [Basic Procedure for Upgrading to Release 15.1X54-D25 on page 12](#)
- [Upgrade and Downgrade Support Policy for Junos OS Releases on page 14](#)

Basic Procedure for Upgrading to Release 15.1X54-D25

When upgrading or downgrading Junos OS, always use the **jinstall** package. Use other packages (such as the **bundle** package) only when so instructed by a Juniper Networks support representative. For information about the contents of the **jinstall** package and details of the installation process, see the *Installation and Upgrade Guide*.



NOTE: Before upgrading, back up the file system and the currently active Junos configuration so that you can recover to a known, stable environment in case the upgrade is unsuccessful. Issue the following command:

```
user@host> request system snapshot
```

The installation process rebuilds the file system and completely reinstalls Junos OS. Configuration information from the previous software installation is retained, but the contents of log files might be erased. Stored files on the routing platform, such as configuration templates and shell scripts (the only exceptions are the `juniper.conf` and `ssh` files), might be removed. To preserve the stored files, copy them to another system before upgrading or downgrading the routing platform. For more information, see *Understanding System Snapshot on an ACX Series Router*.

On ACX5000 series router, you can take a snapshot of the existing Junos OS by inserting an external USB storage device and executing the **request system snapshot slice alternate** command. This command takes a snapshot of the current running Junos OS on to the external USB storage device.

The download and installation process for Junos OS Release 15.1X54–D25 is different from previous Junos OS releases.

1. Using a Web browser, navigate to the **All Junos Platforms** software download URL on the Juniper Networks web page:
<http://www.juniper.net/support/downloads/>
2. Select the name of the Junos platform for the software that you want to download.
3. Select the release number (the number of the software version that you want to download) from the **Release** drop-down list to the right of the Download Software page.
4. Select the **Software** tab.

5. In the **Install Package** section of the **Software** tab, 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 Juniper Networks representatives.
7. Review and accept the End User License Agreement.
8. Download the software to a local host.
9. Copy the software to the routing platform or to your internal software distribution site.
10. Install the new **jinstall** package on the routing platform.



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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.

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Customers in the United States and Canada use the following command:

```
user@host> request system software add validate reboot  
source/jinstall-acx5k-15.1X54-D25.14-domestic-signed.tgz force-host
```

Replace *source* with one of the following values:

- */pathname*—For a software package that is installed from a local directory on the router.
- For software packages that are downloaded and installed from a remote location:
 - *ftp://hostname/pathname*
 - *http://hostname/pathname*
 - *scp://hostname/pathname* (available only for Canada and U.S. version)

The **validate** option validates the software package against the current configuration as a prerequisite to adding the software package to ensure that the router reboots successfully. This is the default behavior when the software package being added is a different release.

Adding the **reboot** command reboots the router after the upgrade is validated and installed. When the reboot is complete, the router displays the login prompt. The loading process can take 5 to 10 minutes.

Rebooting occurs only if the upgrade is successful.



NOTE: After you install a Junos OS Release 15.1X54-D25 *jinstall* package, you cannot issue the **request system software rollback** command to return to the previously installed software. Instead you must issue the **request system software add validate** command and specify the *jinstall* package that corresponds to the previously installed software.

Upgrade and Downgrade Support Policy for Junos OS Releases

Support for upgrades and downgrades that span more than three Junos OS releases at a time is not provided, except for releases that are designated as Extended End-of-Life (EEOL) releases. EEOL releases provide direct upgrade and downgrade paths—you can upgrade directly from one EEOL release to the next EEOL release even though EEOL releases generally occur in increments beyond three releases.

You can upgrade or downgrade to the EEOL release that occurs directly before or after the currently installed EEOL release, or to two EEOL releases before or after. For example, Junos OS Releases 10.0, 10.4, and 11.4 are EEOL releases. You can upgrade from Junos OS Release 10.0 to Release 10.4 or even from Junos OS Release 10.0 to Release 11.4. However, you cannot upgrade directly from a non-EEOL release that is more than three releases ahead or behind. For example, you cannot directly upgrade from Junos OS Release 10.3 (a non-EEOL release) to Junos OS Release 11.4 or directly downgrade from Junos OS Release 11.4 to Junos OS Release 10.3.

To upgrade or downgrade from a non-EEOL release to a release more than three releases before or after, first upgrade to the next EEOL release and then upgrade or downgrade from that EEOL release to your target release.

For more information on EEOL releases and to review a list of EEOL releases, see <http://www.juniper.net/support/eol/junos.html>.

**Related
Documentation**

- [New Features in Junos OS Release 15.1X54-D25 for ACX Series Routers on page 3](#)
- [Known Limitations in Junos OS Release 15.1X54-D25 for ACX Series Routers on page 5](#)

Junos OS Documentation and Release Notes

For a list of related Junos OS documentation, see <http://www.juniper.net/techpubs/software/junos/>.

If the information in the latest release notes differs from the information in the documentation, follow the *Junos OS Release Notes*.

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

Juniper Networks supports a technical book program to publish books by Juniper Networks engineers and subject matter experts with book publishers around the world. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration using the Junos operating system (Junos OS) and Juniper Networks devices. In addition, the Juniper Networks Technical Library, published in conjunction with O'Reilly Media, explores improving network security, reliability, and availability using Junos OS configuration techniques. All the books are for sale at technical bookstores and book outlets around the world. The current list can be viewed at <http://www.juniper.net/books>.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

- Document name
- Document part number
- Page number
- Software release version

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 postsales 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 Management tool: <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 Management 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 us at <http://www.juniper.net/support/requesting-support.html>.

If you are reporting a hardware or software problem, issue the following command from the CLI before contacting support:

```
user@host> request support information | save filename
```

To provide a core file to Juniper Networks for analysis, compress the file with the **gzip** utility, rename the file to include your company name, and copy it to **ftp.juniper.net:pub/incoming**. Then send the filename, along with software version information (the output of the **show version** command) and the configuration, to **support@juniper.net**. For documentation issues, fill out the bug report form located at <https://www.juniper.net/cgi-bin/docbugreport/>.

Revision History

25 February, 2016—Revision 1, Junos OS Release 15.1X54-D25 – ACX Series Routers.

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