Release Notes for Cisco 8000 Series Routers, IOS XR Release 7.3.3

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Cisco 8100, 8200, and 8800 Series Routers

Note This software release has reached end-of-life status. For more information see the End-of-Life and End-of-Sale Notices.

Note Cisco IOS XR Release 7.3.3 is an Extended Maintenance Release of Cisco IOS XR Release 7.3.1 for Cisco 8000 Series routers. For more details on the Cisco IOS XR release model and associated support, see Guidelines for Cisco IOS XR Software.

What's New in Cisco IOS XR Release 7.3.3

Cisco is continuously enhancing the product with every release and this section covers a brief description of key features and enhancements. It also includes links to detailed documentation, where available.

New in Documentation

This release introduces rich and intuitive ways for you to access YANG data models supported in the Cisco IOS XR software.

Product	Description
Cisco IOS XR Error Messages	Search by release number, error strings, or compare release numbers to view a detailed repository of error messages and descriptions.
Cisco IOS XR MIBs	Select the MIB of your choice from a drop-down to explore an extensive repository of MIB information.
YANG Data Models Navigator	We have launched the tool as an easy reference to view the Data Models (Native, Unified, OpenConfig) supported in IOS XR platforms and releases. You can explore the data model definitions, locate a specific model, and view the containers and their respective lists, leaves, leaf lists, Xpaths, and much more. As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note here.
Use Case-based Documentation at Learning Labs	You can now quickly explore and experiment on use-cases without setting up any hardware resources with the new Interactive documentation for Cisco 8000 routers on DevNet Learning Labs. Powered by Jupyter, the automated code blocks within the documentation enable you to configure the desired functionality on the routers and retrieve real-time output swiftly. Check out the new interactive documentation here: • End to end 3-stage CLOS Networks for SONiC • Use cases for QoS and Model-driven Telemetry

Software Features Introduced and Enhanced

To learn about features introduced in other Cisco IOS XR releases, select the release from the What's new page.

Feature	Description
Programmability	
Revised OpenConfig MPLS Model to Version 3.0.1 for Streaming Telemetry	The OpenConfig MPLS data model provides data definitions for Multiprotocol Label Switching (MPLS) configuration and associated signaling and traffic engineering protocols. In this release, the following data models are revised for streaming telemetry from OpenConfig version 2.3.0 to version 3.0.1: • openconfig-mpls • openconfig-mpls-te • openconfig-mpls-rsvp • openconfig-mpls-igp • openconfig-mpls-types • openconfig-mpls-sr You can access this data model from the Github repository.
Telemetry	
Enhanced Syslog Notifications for Unresolved Line Card Forwarding Paths	This feature notifies you of Line Card and Route Processor paths not resolving in the Forwarding Information Base. Both Model-Driven Telemetry (MDT) and Event Driven Telemetry (EDT) notifications are supported. In earlier releases, notifications for route processors were supported. This feature provides for improved diagnostics.
Stream QoS Statistics Telemetry Data	You can use the `Cisco-IOS-XR-qos-ma-oper.yang` data model to stream telemetry data on QoS statistics from the route processor (RP). The bundle statistics are now stored in the RP, where data is persistent, and its retrieval is unaffected by bundle member or line card failure. In earlier releases, QoS statistics was stored on line cards, and any bundle member or line card failure caused loss of statistics data.
Target-Defined Mode for Cached Generic Counters Data	This feature streams telemetry data for cached generic counters using a TARGET_DEFINED subscription. This subscription ensures that any change to the cache streams the latest data to the collector as an event-driven telemetry notification. This feature introduces support for the following sensor path: `Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/cache/generic-counters`
BGP	
BGP Extended Route Retention	This feature allows you to maintain stale routing information from a failed BGP peer for longer periods of time than that is configured in the Graceful Restart atribute. However, this feature ensures that the BGP neighbor considers the stale routes as new routes.

Feature	Description
BGP FlowSpec Actions: Redirect next hop VRF only Rate Limit and Redirect IPv4 or IPv6 next hop Rate Limit and Redirect next hop VRF	This feature provides information on the actions that can be associated with a BGP flow. The traffic filtering flow specification is applied based on the specified rule. The following extended community values that can be used to specify particular action: • Redirect next hop VRF only: Redirects the traffic to a different Autonomous System Number (ASN). • Rate Limit and redirect IPv4 or IPv6 next hop: Redirects the traffic to the indicated next hop IPv4 or IPv6 address. The policer rate regulates the traffic. • Rate limit and redirect next hop VRF: Redirects the traffic to the next hop IPv4 address through a VRF. The policer rate regulates the traffic.
Configure 1024 ECMPs or 256 UCMPs using Hierarchical Load Balancing	This feature allows you to configure up to 1024 ECMPs or 256 UCMPs to reach a destination. You can achieve this by splitting the routes into multiple hierarchical-based ECMPs or UCMPs. This enables ECMP to expand beyond the hardware limitation of only 512 ECMPs. In earlier releases, you could configure only up to 128 ECMPs.
Interface and Hardware Component	
Flexible Assignment of UDP Port Numbers for Decapsulation	This feature gives you the flexibility to assign UDP port numbers from 1000 through 6400, through which IPv4, IPv6, and MPLS packets can be decapsulated. Such flexibility allows you to segregate the ingress traffic based on a QoS policy. In earlier releases, you could assign only default ports for decapsulation. The following command is introduced for this feature: `hw-module profile gue udp-dest-port ipv4 <port number> ipv6 <port number> mpls <port number>`
Support for LLDP Snooping	With this release, you can further leverage the Link Layer Discovery Protocol (LLDP) information for directly attached devices or equipment in a Layer 2 network via LLDP snoop. With the help of the LLDP snoop functionality, you can identify the cabling and modeling failures and isolate faults. To enable LLDP snoop, enable LLDP on an interface while the outgoing (TX) traffic is disabled.
IP Addresses and Services	
VRF redirect in ACL Based Forwarding (ABF)	With this feature, the ABF supports VRF redirect for IPv4 and IPv6 addresses. Here, the ACE rule has the next-hop VRF specified, and the incoming traffic matching the ACE conditions, is forwarded to the first available VRF specified in the ACE rule.
User Managed Control Plane and Management Plane ACL	You can create a virtual LPTS interface and apply hybrid ACLs to it for inspecting traffic. This functionality lets you use the hybrid ACLs to filter and customize the control plane and management plane traffic. This feature modifies the following command: • **hw-module profile cef**
MPLS	

Feature	Description
Configuring Automatic Capacity With Load-Interval Configuration	With this feature, you can enable the load-interval configuration for a main tunnel's clones, along with the automatic capacity feature.
Netflow	
Ingress SFlow Enhancements	The ingress SFlow packet supports the following to provide better scalability and reduce the packets at the receiver: • Increase in SFlow datagram—1500B up to 9KB • Support for tunnel encapsulation—The packet header supports an extended structure which includes the tunnel header information. The egress packet decapsulates the tunnel information. • SFlow collector reports discarded packets and locally destined packets at the output interfaces with a format and drop value.
Modular QoS	
ACL Based Forwarding (ABF) support with Peering QoS	With this feature, ABF is included in ACL scaling merge with Peering QoS. This provides routers the capability to classify packets based on the ABF ACEs in addition with Peering QoS. This helps in remarking packets.
Equitable Traffic Flow Using Fair VOQ	Configuring this feature ensures that ingress traffic from various source ports on every network slice of an NPU is assigned a unique virtual output queue (VOQ) for every source port and destination port pair. This action ensures that the bandwidth available at the destination port for a given traffic class is distributed equally to all source ports requesting bandwidth. In earlier releases, the traffic wasn't distributed equitably because each slice wasn't given its fair share of the output queue bandwidth. This feature introduces the **fair-4** and **fair-8** keywords in the **hw-module profile qos voq-mode** command.
Shortlink Priority Flow Control	With this release, the split-virtual output queuing (VoQ) supports shortlink Priority Flow Control (PFC) on the following line cards: • 88-LC0-36FH-M • 88-LC0-36FH This enhacement enables the per slice bandwidth to be increased to 1.6T from 800 GbE. Thus, allowing the network traffic to flow without any interruptions or data loss.
System Security	
Dynamic Power Management for MACSec-Enabled Ports	From this release, the Dynamic Power Management feature—which allocates power to the fabric and line cards based on certain dynamic factors—also factors in the power requirement for bringing up MACSec sessions on the line card interfaces. This feature thus ensures optimal use of the power supply units (PSUs) by providing more accurate dynamic power calculation for the hardware. This feature is supported on 88-LC0-36FH-M, 88-LC0-34H14FH, and 8800-LC-48H line cards.
Segment Routing	

Feature	Description
Advertising EPE-Enabled BGP Neighbors via BGP-LU	BGP peering segments/SIDs are part of the Segment Routing Centralized BGP Egress Peer Engineering solution (BGP-EPE). A BGP-EPE-enabled border router allocates and programs BGP peering SIDs (EPE labels) to steer traffic over a specific external interface/BGP neighbor to reach a particular destination. This feature provides an alternate BGP-EPE solution leveraging BGP peering segments. It allows a BGP-EPE-enabled border router to use BGP Labeled Unicast (BGP-LU) to advertise the IP address of a neighbor with an LU label equal to the EPE label assigned to that neighbor.
IP Lookup for Failed BGP Peering (EPE) Segments	BGP peering segments/SIDs are part of the Segment Routing Centralized BGP Egress Peer Engineering solution (BGP-EPE). A BGP-EPE-enabled border router allocates and programs BGP peering SIDs (EPE labels) to steer traffic over a specific external interface/BGP neighbor to reach a particular destination. This feature allows a BGP-EPE-enabled border router to pop the EPE label and forward traffic based on an IP-based lookup when a BGP neighbor fails. Traffic arriving with the EPE label assigned to a failed neighbor is forwarded based on a destination IP address lookup to allow traffic to be forwarded over a different directly connected external peer.
System Management	
Smart Licensing Support for 88-LC0-34H14FH Line Card	The support for flexible consumption model of smart licensing is now extended to the line card 88-LC0-34H14FH.
ITU-T G.8275.2 profile support	This feature supports the architecture defined in ITU-T G.8275.2 for systems requiring accurate phase and time synchronisation, phase or time-of-day synchronization is required, and where it is not required that each device in the network participates in the PTP protocol.

Hardware Introduced

This release introduces the following new hardware:

Hardware Feature	Description
88-LC0-34H14FH based on Q200 Silicon Chip	This release introduces a 48-port combo line card that provides 9 Tbps of throughput. The 88-LC0-34H14FH line card is Q200 silicon chip-based and comprises 34 ports of 100GE (QSFP28) and 14 ports of 400GE (QSFP-DD). Sixteen 100GE ports are MACSec capable. 100GE ports support 4x10/25G breakout, and 400GE ports support 4x100G, 2x100G, and 4x10/25G breakout. The 88-LC0-34H14FH line card is supported on Cisco 8800 series modular chassis. For more information on this line card, see the Cisco 8000 Series Routers Data Sheet.

Hardware Feature	Description
Support for QDD-4x100G-LR-S and QDD-400G-LR4-S Optical Modules	The QDD-4x100G-LR and QDD-400G-LR4-S optical modules offer a wide variety of high-density transceiver modules and the flexibility of 400 Gigabit Ethernet connectivity options for data centers, high-performance computing networks, enterprise core, and distribution layers, and service provider applications. The Cisco QDD-4X100G-LR-S Module supports 100G breakout link lengths of up to 10km. The 400 Gigabit Ethernet signal is carried over four parallel lanes by one wavelength per lane. You can use it as a 4x100G breakout to QSFP28 100G-DR (up to 500m), 100G-FR (up to 2km), and 100G-LR (up to10km). The Cisco QDD-400G-LR4-S Module supports link lengths of up to 10km SMF with a duplex LC connector. The 400 Gigabit Ethernet signal is carried over four CWDM grid optical wavelengths. For more information on these optical modules, see the Cisco 400G QSFP-DD Cable and Transceiver Modules Datasheet.

For a complete list of supported hardware and ordering information, see the Cisco 8000 Series Data Sheet.

Release 7.3.3 Packages

The Cisco IOS XR software is composed of a base image (ISO) that provides the XR infrastructure. The ISO image is made up of a set of packages (also called RPMs). These packages are of three types:

- A mandatory package that is included in the ISO
- An optional package that is included in the ISO
- An optional package that is not included in the ISO

Visit the Cisco Software Download page to download the Cisco IOS XR software images.

To determine the Cisco IOS XR Software packages installed on your router, log in to the router and enter the **show install active** command:

```
RP/0/RP0/CPU0#show install active
Package                                                                  Version
---------------------------------------------------- ---------------------------
xr-8000-af-ea                                                      7.3.3v1.0.0-1
xr-8000-aib                                                        7.3.3v1.0.0-1
xr-8000-bfd                                                        7.3.3v1.0.0-1
xr-8000-bmc                                                        7.3.3v1.0.0-1
xr-8000-buffhdr-ea                                                 7.3.3v1.0.0-1
xr-8000-bundles                                                    7.3.3v1.0.0-1
xr-8000-card-support                                               7.3.3v1.0.0-1
xr-8000-cdp-ea                                                     7.3.3v1.0.0-1
xr-8000-cfm                                                        7.3.3v1.0.0-1
xr-8000-core                                                       7.3.3v1.0.0-1
xr-8000-cpa                                                        7.3.3v1.0.0-1
xr-8000-cpa-npu                                                    7.3.3v1.0.0-1
xr-8000-cpa-sb-data                                                7.3.3v1.0.0-1
xr-8000-dot1x                                                      7.3.3v1.0.0-1
```

xr-8000-dsm	7.3.3v1.0.0-1
xr-8000-encap-id	7.3.3v1.0.0-1
xr-8000-ether-ea	7.3.3v1.0.0-1
xr-8000-fabric	7.3.3v1.0.0-1
xr-8000-feat-mgr	7.3.3v1.0.0-1
xr-8000-fib-ea	7.3.3v1.0.0-1
xr-8000-forwarder	7.3.3v1.0.0-1
xr-8000-fpd	7.3.3v1.0.0-1
xr-8000-fwdlib	7.3.3v1.0.0-1
xr-8000-host-core	7.3.3v1.0.0-1
xr-8000-l2fib	7.3.3v1.0.0-1
xr-8000-leabaofa	7.3.3v1.0.0-1
xr-8000-libofaasync	7.3.3v1.0.0-1
xr-8000-lpts-ea	7.3.3v1.0.0-1
xr-8000-mcast	7.3.3v1.0.0-1
xr-8000-netflow	7.3.3v1.0.0-1
xr-8000-npu	7.3.3v1.0.0-1
xr-8000-oam	7.3.3v1.0.0-1
xr-8000-optics	7.3.3v1.0.0-1
xr-8000-os	7.3.3v1.0.0-1
xr-8000-os-extra	7.3.3v1.0.0-1
xr-8000-pbr	7.3.3v1.0.0-1
xr-8000-pfilter	7.3.3v1.0.0-1
xr-8000-pidb	7.3.3v1.0.0-1
xr-8000-pktio	7.3.3v1.0.0-1
xr-8000-port-mapper	7.3.3v1.0.0-1
xr-8000-port-mode	7.3.3v1.0.0-1
xr-8000-ppinfo	7.3.3v1.0.0-1
xr-8000-qos-ea	7.3.3v1.0.0-1
xr-8000-secy-driver	7.3.3v1.0.0-1
xr-8000-span	7.3.3v1.0.0-1
xr-8000-spio	7.3.3v1.0.0-1
xr-8000-spp-ea	7.3.3v1.0.0-1
xr-8000-tams	7.3.3v1.0.0-1
xr-8000-timing	7.3.3v1.0.0-1
xr-8000-tunnel-ip	7.3.3v1.0.0-1
xr-8000-utapp-blaze	7.3.3v1.0.0-1
xr-8000-vether	7.3.3v1.0.0-1
xr-8000-ztp-ea	7.3.3v1.0.0-1
xr-aaa	7.3.3v1.0.0-1
xr-acl	7.3.3v1.0.0-1
xr-apphosting	7.3.3v1.0.0-1
xr-appmgr	7.3.3v1.0.0-1
xr-bcdl	7.3.3v1.0.0-1
xr-bfd	7.3.3v1.0.0-1
xr-bgp	7.3.3v1.0.0-1
xr-bgputil	7.3.3v1.0.0-1
xr-bng-stubs	7.3.3v1.0.0-1
xr-bundles	7.3.3v1.0.0-1
xr-cal-pi	7.3.3v1.0.0-1
xr-cdp	7.3.3v1.0.0-1
xr-cds	7.3.3v1.0.0-1
xr-cfgmgr	7.3.3v1.0.0-1
xr-cfm	7.3.3v1.0.0-1
xr-cofo	7.3.3v1.0.0-1
xr-core	7.3.3v1.0.0-1
xr-core-calv	7.3.3v1.0.0-1
xr-cpa-common	7.3.3v1.0.0-1
xr-cpa-common-optics	7.3.3v1.0.0-1
xr-cpa-common-psu	7.3.3v1.0.0-1
xr-cpa-driver-devobj-misc	7.3.3v1.0.0-1
xr-cpa-driver-devobj-npu	7.3.3v1.0.0-1
xr-cpa-driver-devobj-phy	7.3.3v1.0.0-1
xr-cpa-driver-devobj-sensors	7.3.3v1.0.0-1

xr-cpa-driver-devobj-storage	7.3.3v1.0.0-1
xr-cpa-driver-devobj-test	7.3.3v1.0.0-1
xr-cpa-driver-devobj-timing	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-access	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-common	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-infra	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-kmod	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-misc	7.3.3v1.0.0-1
xr-cpa-driver-fpgalib-optics	7.3.3v1.0.0-1
xr-cpa-driver-optics	7.3.3v1.0.0-1
xr-cpa-ethsw	7.3.3v1.0.0-1
xr-cpa-idprom	7.3.3v1.0.0-1
xr-cpa-tamlib	7.3.3v1.0.0-1
xr-ctc	7.3.3v1.0.0-1
xr-debug	7.3.3v1.0.0-1
xr-dhcp	7.3.3v1.0.0-1
xr-diskboot	7.3.3v1.0.0-1
xr-drivers	7.3.3v1.0.0-1
xr-eem	7.3.3v1.0.0-1
xr-elmi-stubs	7.3.3v1.0.0-1
xr-ema	7.3.3v1.0.0-1
xr-enhancedmanageability	7.3.3v1.0.0-1
xr-fib	7.3.3v1.0.0-1
xr-filesysinv	7.3.3v1.0.0-1
xr-foundation-8000	7.3.3v1.0.0-1
xr-fpd	7.3.3v1.0.0-1
xr-ha-infra	7.3.3v1.0.0-1
xr-healthcheck	7.3.3v1.0.0-1
xr-host-core	7.3.3v1.0.0-1
xr-httpclient	7.3.3v1.0.0-1
xr-icpe-eth	7.3.3v1.0.0-1
xr-icpe-opt	7.3.3v1.0.0-1
xr-identifier	7.3.3v1.0.0-1
xr-infra-sla	7.3.3v1.0.0-1
xr-install	7.3.3v1.0.0-1
xr-ip-apps	7.3.3v1.0.0-1
xr-ip-core	7.3.3v1.0.0-1
xr-ip-infra-vrf	7.3.3v1.0.0-1
xr-ip-mibs	7.3.3v1.0.0-1
xr-ip-static	7.3.3v1.0.0-1
xr-ipc	7.3.3v1.0.0-1
xr-ipsla	7.3.3v1.0.0-1
xr-is-is	7.3.3v1.0.0-1
xr-k9sec	7.3.3v1.0.0-1
xr-l2snooptransport	7.3.3v1.0.0-1
xr-l2vpn	7.3.3v1.0.0-1
xr-ldp	7.3.3v1.0.0-1
xr-licensing	7.3.3v1.0.0-1
xr-link-oam	7.3.3v1.0.0-1
xr-linuxnetworking	7.3.3v1.0.0-1
xr-lldp	7.3.3v1.0.0-1
xr-lpts	7.3.3v1.0.0-1
xr-manageabilityxml	7.3.3v1.0.0-1
xr-mandatory	7.3.3v1.0.0-1
xr-mcast	7.3.3v1.0.0-1
xr-mda	7.3.3v1.0.0-1
xr-mpls	7.3.3v1.0.0-1
xr-mpls-oam	7.3.3v1.0.0-1
xr-mpls-oam-client	7.3.3v1.0.0-1
xr-mpls-static	7.3.3v1.0.0-1
xr-netflow	7.3.3v1.0.0-1
xr-networkboot	7.3.3v1.0.0-1
xr-nosi	7.3.3v1.0.0-1
xr-ntp	7.3.3v1.0.0-1

```
xr-ofa                                   7.3.3v1.0.0-1
xr-optics                                7.3.3v1.0.0-1
xr-orrspf                                7.3.3v1.0.0-1
xr-os                                    7.3.3v1.0.0-1
xr-ospf                                  7.3.3v1.0.0-1
xr-perf-meas                             7.3.3v1.0.0-1
xr-perfmgmt                              7.3.3v1.0.0-1
xr-pfi                                   7.3.3v1.0.0-1
xr-platforms-ras                         7.3.3v1.0.0-1
xr-pm-alarm                              7.3.3v1.0.0-1
xr-procmgr                               7.3.3v1.0.0-1
xr-python                                7.3.3v1.0.0-1
xr-qos                                   7.3.3v1.0.0-1
xr-rid-mgr                               7.3.3v1.0.0-1
xr-routing                               7.3.3v1.0.0-1
xr-rpl                                   7.3.3v1.0.0-1
xr-rsvp-te                               7.3.3v1.0.0-1
xr-security                              7.3.3v1.0.0-1
xr-servicelayer                          7.3.3v1.0.0-1
xr-snmp                                  7.3.3v1.0.0-1
xr-span                                  7.3.3v1.0.0-1
xr-spi-core                              7.3.3v1.0.0-1
xr-spi-hw                                7.3.3v1.0.0-1
xr-spp                                   7.3.3v1.0.0-1
xr-sr                                    7.3.3v1.0.0-1
xr-stats                                 7.3.3v1.0.0-1
xr-stp                                   7.3.3v1.0.0-1
xr-stubs                                 7.3.3v1.0.0-1
xr-sysdb                                 7.3.3v1.0.0-1
xr-syslog                                7.3.3v1.0.0-1
xr-telemetry                             7.3.3v1.0.0-1
xr-telnet                                7.3.3v1.0.0-1
xr-timing                                7.3.3v1.0.0-1
xr-tmpdir-cleanup                        7.3.3v1.0.0-1
xr-track                                 7.3.3v1.0.0-1
xr-transports                            7.3.3v1.0.0-1
xr-tty                                   7.3.3v1.0.0-1
xr-tunnel-ip                             7.3.3v1.0.0-1
xr-utils                                 7.3.3v1.0.0-1
xr-vether                                7.3.3v1.0.0-1
xr-vpnmib                                7.3.3v1.0.0-1
xr-xmlinfra                              7.3.3v1.0.0-1
xr-xrlibcurl                             7.3.3v1.0.0-1
xr-ztp                                   7.3.3v1.0.0-1
```

To know about all the RPMs installed including XR, OS and other components use the **show install active all** command.

The software modularity approach provides a flexible model that allows you to install a subset of IOS XR packages on devices based on your individual requirements. All critical components are modularized as packages so that you can select the features that you want to run on your router.

Note The above show command output displays mandatory packages that are installed on the router. To view the optional and bug fix RPM packages, first install the package and use the **show install active summary** command.

Caveats

These caveats are applicable for Cisco IOS XR Software:

Bug ID	Headline
CSCwa34439	MPLS TE tunnel flaps continuously if RSVP GR is configured
CSCvz44123	FPD Bios ACCESS failure 'fail to get Bios fpd info'
CSCwa14634	FIB tracebacks after RPFO

Determine Software Version

Log in to the router and enter the **show version** command:

```
RP/0/RP0/CPU0# show version
Cisco IOS XR Software, Version 7.3.3 LNT
Copyright (c) 2013-2022 by Cisco Systems, Inc.

Build Information:
Built By     : ingunawa
Built On     : Sat Jan 29 10:33:37 UTC 2022
Build Host   : iox-ucs-060
Workspace    : /auto/srcarchive16/prod/7.3.3/8000/ws
Version      : 7.3.3
Label        : 7.3.3

cisco 8000 (Intel(R) Xeon(R) CPU D-1530 @ 2.40GHz)
cisco 8808 (Intel(R) Xeon(R) CPU D-1530 @ 2.40GHz) processor with 32GB of memory
R1-D8-GB uptime is 1 hour, 1 minute
Cisco 8808 8-slot Chassis
```

Determine Firmware Support

Log in to the router and enter **show fpd package** command:

Cisco 8200 Series Router

```
RP/0/RP0/CPU0# show fpd package
================================ ============================================
                                        Field Programmable Device Package
                                 ============================================
                                              Req      SW       Min Req   Min Req
Card Type            FPD Description          Reload   Ver      SW Ver    Board Ver
================== ========================== ====== ======== ========= ==========
-------------------------------------------------------------------------------
8201                 Bios                       YES     1.22      1.22       0.0
                     BiosGolden                 YES     1.22      1.15       0.0
                     BmcFitGolden               YES     3.300     0.240      0.0
                     BmcFitPrimary              YES     3.300     3.300      0.0
                     BmcUbootGolden             YES     1.02      0.15       0.0
                     BmcUbootPrimary            YES     1.02      1.02       0.0
                     IoFpga                     YES     1.06      1.06       0.1
                     IoFpgaGolden               YES     1.06      0.48       0.1
                     SsdIntelS3520              YES     1.21      1.21       0.0
                     SsdIntelS4510              YES    11.32     11.32       0.0
                     SsdMicron5100              YES     7.01      7.01       0.0
                     SsdMicron5300              YES     0.01      0.01       0.0
                     x86Fpga                    YES     1.02      1.02       0.0
                     x86FpgaGolden              YES     1.02      0.48       0.0
                     x86TamFw                   YES     5.06      5.06       0.0
```

	x86TamFwGolden	YES	5.06	5.05	0.0
8201-ON	Bios	YES	1.208	1.208	0.0
	BiosGolden	YES	1.208	1.207	0.0
	BmcFitGolden	YES	3.300	0.240	0.0
	BmcFitPrimary	YES	3.300	3.300	0.0
	BmcUbootGolden	YES	1.02	0.15	0.0
	BmcUbootPrimary	YES	1.02	1.02	0.0
	IoFpga	YES	1.06	1.06	0.1
	IoFpgaGolden	YES	1.06	0.48	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.02	1.02	0.0
	x86FpgaGolden	YES	1.02	0.48	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8201-SYS	Bios	YES	1.22	1.22	0.0
	BiosGolden	YES	1.22	1.15	0.0
	BmcFitGolden	YES	3.300	0.240	0.0
	BmcFitPrimary	YES	3.300	3.300	0.0
	BmcUbootGolden	YES	1.02	0.15	0.0
	BmcUbootPrimary	YES	1.02	1.02	0.0
	IoFpga	YES	1.06	1.06	0.1
	IoFpgaGolden	YES	1.06	0.48	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.02	1.02	0.0
	x86FpgaGolden	YES	1.02	0.48	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8201-SYS-ON	Bios	YES	1.208	1.208	0.0
	BiosGolden	YES	1.208	1.207	0.0
	BmcFitGolden	YES	3.300	0.240	0.0
	BmcFitPrimary	YES	3.300	3.300	0.0
	BmcUbootGolden	YES	1.02	0.15	0.0
	BmcUbootPrimary	YES	1.02	1.02	0.0
	IoFpga	YES	1.06	1.06	0.1
	IoFpgaGolden	YES	1.06	0.48	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.02	1.02	0.0
	x86FpgaGolden	YES	1.02	0.48	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
PSU-2KW-HVPI	PO-PrimMCU	NO	17.136	17.136	0.0
PSU1.4KW-ACPE	DC-PrimMCU	NO	3.01	3.01	0.0
	DC-SecMCU	NO	2.02	2.02	0.0
PSU1.4KW-ACPI	DC-PrimMCU	NO	3.01	3.01	0.0
	DC-SecMCU	NO	2.02	2.02	0.0
PSU2KW-ACPE	PO-PrimMCU	NO	17.54	17.54	0.0
PSU2KW-ACPI	PO-PrimMCU	NO	17.56	17.56	0.0

```
--------------------------------------------------------------------------------
PSU2KW-DCPE          PO-PrimMCU                NO      1.07      1.07      0.0
--------------------------------------------------------------------------------
PSU2KW-DCPI          PO-PrimMCU                NO      1.07      1.07      0.0
```

Cisco 8800 Series Router

```
RP/0/RP0/CPU0# show fpd package
================================ ==============================================
                                        Field Programmable Device Package
                                 ==============================================
                                          Req      SW       Min Req   Min Req
Card Type            FPD Description      Reload   Ver      SW Ver    Board Ver
==================== ==================== ====== ======= ======== =========
--------------------------------------------------------------------------------
88-LC0-34H14FH       Bios                 YES     1.02      1.02      0.0
                     BiosGolden           YES     1.02      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.01      1.01      0.1
                     IoFpgaGolden         YES     1.01      1.01      0.1
                     SsdIntelS3520        YES     1.21      1.21      0.0
                     SsdIntelS4510        YES    11.32     11.32      0.0
                     SsdMicron5100        YES     7.01      7.01      0.0
                     SsdMicron5300        YES     0.01      0.01      0.0
                     x86Fpga              YES     0.78      0.78      0.1
                     x86FpgaGolden        YES     0.78      0.78      0.1
                     x86TamFw             YES     6.10      6.10      0.1
                     x86TamFwGolden       YES     6.10      6.10      0.1
--------------------------------------------------------------------------------
88-LC0-34H14FH-O     Bios                 YES     0.218     0.218     0.0
                     BiosGolden           YES     0.218     0.218     0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.01      1.01      0.1
                     IoFpgaGolden         YES     1.01      1.01      0.1
                     SsdIntelS3520        YES     1.21      1.21      0.0
                     SsdIntelS4510        YES    11.32     11.32      0.0
                     SsdMicron5100        YES     7.01      7.01      0.0
                     SsdMicron5300        YES     0.01      0.01      0.0
                     x86Fpga              YES     0.78      0.78      0.1
                     x86FpgaGolden        YES     0.78      0.78      0.1
                     x86TamFw             YES     6.10      6.10      0.1
                     x86TamFwGolden       YES     6.10      6.10      0.1
--------------------------------------------------------------------------------
88-LC0-36FH          Bios                 YES     1.02      1.02      0.0
                     BiosGolden           YES     1.02      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.00      1.00      0.1
                     IoFpgaGolden         YES     1.00      1.00      0.1
                     SsdIntelS3520        YES     1.21      1.21      0.0
                     SsdIntelS4510        YES    11.32     11.32      0.0
                     SsdMicron5100        YES     7.01      7.01      0.0
                     SsdMicron5300        YES     0.01      0.01      0.0
                     x86Fpga              YES     1.06      1.06      0.1
                     x86FpgaGolden        YES     1.06      1.04      0.1
                     x86TamFw             YES     6.05      6.05      0.1
                     x86TamFwGolden       YES     6.05      6.05      0.1
--------------------------------------------------------------------------------
88-LC0-36FH-M        Bios                 YES     1.02      1.02      0.0
                     BiosGolden           YES     1.02      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
```

	IoFpga	YES	1.00	1.00	0.1
	IoFpgaGolden	YES	1.00	1.00	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.06	1.06	0.1
	x86FpgaGolden	YES	1.06	1.04	0.1
	x86TamFw	YES	6.05	6.05	0.1
	x86TamFwGolden	YES	6.05	6.05	0.1
88-LC0-36FH-MO	Bios	YES	0.218	0.218	0.0
	BiosGolden	YES	0.218	0.218	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.00	1.00	0.1
	IoFpgaGolden	YES	1.00	1.00	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.06	1.06	0.1
	x86FpgaGolden	YES	1.06	1.04	0.1
	x86TamFw	YES	6.05	6.05	0.1
	x86TamFwGolden	YES	6.05	6.05	0.1
88-LC0-36FH-O	Bios	YES	0.218	0.218	0.0
	BiosGolden	YES	0.218	0.218	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.00	1.00	0.1
	IoFpgaGolden	YES	1.00	1.00	0.1
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.06	1.06	0.1
	x86FpgaGolden	YES	1.06	1.04	0.1
	x86TamFw	YES	6.05	6.05	0.1
	x86TamFwGolden	YES	6.05	6.05	0.1
8800-LC-36FH	Bios	YES	1.22	1.22	0.0
	BiosGolden	YES	1.22	1.15	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.12	1.12	0.0
	IoFpgaGolden	YES	1.12	0.08	0.0
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.13	1.13	0.0
	x86FpgaGolden	YES	1.13	0.33	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8800-LC-36FH-O	Bios	YES	1.208	1.208	0.0
	BiosGolden	YES	1.208	1.207	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.12	1.12	0.0
	IoFpgaGolden	YES	1.12	0.08	0.0
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0

	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.13	1.13	0.0
	x86FpgaGolden	YES	1.13	0.33	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8800-LC-48H	Bios	YES	1.22	1.22	0.0
	BiosGolden	YES	1.22	1.15	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.12	1.12	0.0
	IoFpgaGolden	YES	1.12	0.08	0.0
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.13	1.13	0.0
	x86FpgaGolden	YES	1.13	0.33	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8800-LC-48H-O	Bios	YES	1.208	1.208	0.0
	BiosGolden	YES	1.208	1.207	0.0
	EthSwitch	YES	1.04	1.04	0.0
	EthSwitchGolden	YES	1.04	0.07	0.0
	IoFpga	YES	1.12	1.12	0.0
	IoFpgaGolden	YES	1.12	0.08	0.0
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	x86Fpga	YES	1.13	1.13	0.0
	x86FpgaGolden	YES	1.13	0.33	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8800-RP	Bios	YES	1.22	1.22	0.0
	BiosGolden	YES	1.22	1.15	0.0
	BmcFitGolden	YES	3.300	0.240	0.0
	BmcFitPrimary	YES	3.300	3.300	0.0
	BmcUbootGolden	YES	1.02	0.15	0.0
	BmcUbootPrimary	YES	1.02	1.02	0.0
	EthSwitch	YES	1.02	1.02	0.0
	EthSwitchGolden	YES	1.02	0.07	0.0
	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	TimingFpga	YES	1.02	1.02	0.0
	TimingFpgaGolden	YES	1.02	0.11	0.0
	x86Fpga	YES	1.23	1.23	0.0
	x86FpgaGolden	YES	1.23	0.24	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8800-RP-O	Bios	YES	1.208	1.208	0.0
	BiosGolden	YES	1.208	1.207	0.0
	BmcFitGolden	YES	3.300	0.240	0.0
	BmcFitPrimary	YES	3.300	3.300	0.0
	BmcUbootGolden	YES	1.02	0.15	0.0
	BmcUbootPrimary	YES	1.02	1.02	0.0
	EthSwitch	YES	1.02	1.02	0.0
	EthSwitchGolden	YES	1.02	0.07	0.0

	SsdIntelS3520	YES	1.21	1.21	0.0
	SsdIntelS4510	YES	11.32	11.32	0.0
	SsdMicron5100	YES	7.01	7.01	0.0
	SsdMicron5300	YES	0.01	0.01	0.0
	TimingFpga	YES	1.02	1.02	0.0
	TimingFpgaGolden	YES	1.02	0.11	0.0
	x86Fpga	YES	1.23	1.23	0.0
	x86FpgaGolden	YES	1.23	0.24	0.0
	x86TamFw	YES	5.06	5.06	0.0
	x86TamFwGolden	YES	5.06	5.05	0.0
8804-FAN	FtFpga	NO	1.00	1.00	0.0
	FtFpgaGolden	NO	1.00	0.16	0.0
8804-FC0	IoFpga	YES	1.00	1.00	0.0
	IoFpgaGolden	YES	1.00	0.16	0.0
8808-FAN	FtFpga	NO	1.00	1.00	0.0
	FtFpgaGolden	NO	1.00	0.16	0.0
8808-FC	IoFpga	YES	1.02	1.02	0.0
	IoFpgaGolden	YES	1.02	0.05	0.0
8808-FC0	IoFpga	YES	1.00	1.00	0.0
	IoFpgaGolden	YES	1.00	0.16	0.0
8812-FAN	FtFpga	NO	1.00	1.00	0.0
	FtFpgaGolden	NO	1.00	0.16	0.0
8812-FC	IoFpga	YES	1.02	1.02	0.0
	IoFpgaGolden	YES	1.02	0.05	0.0
	Retimer	YES	3.00	3.00	0.0
8818-FAN	FtFpga	NO	1.00	1.00	0.0
	FtFpgaGolden	NO	1.00	0.16	0.0
8818-FC	IoFpga	YES	1.02	1.02	0.0
	IoFpgaGolden	YES	1.02	0.05	0.0
	Retimer	YES	3.00	3.00	0.0
8818-FC0	IoFpga	YES	1.00	1.00	0.0
	IoFpgaGolden	YES	1.00	0.16	0.0
	Retimer	YES	3.00	3.00	0.0
PSU-4.8KW-DC100	PO-PrimMCU	NO	51.85	51.85	0.0
PSU6.3KW-20A-HV	DT-LogicMCU	NO	1.00	1.00	0.0
	DT-PrimMCU	NO	1.00	1.00	0.0
	DT-SecMCU	NO	1.00	1.00	0.0
PSU6.3KW-HV	AB-LogicMCU	NO	3.08	3.08	0.0
	AB-PrimMCU	NO	3.08	3.08	0.0
	AB-SecMCU	NO	3.06	3.06	0.0
	DT-LogicMCU	NO	4.11	4.11	0.0
	DT-PrimMCU	NO	4.01	4.01	0.0
	DT-SecMCU	NO	4.00	4.00	0.0
PWR-4.4KW-DC-V3	DT-LogicMCU	NO	3.02	3.02	0.0
	DT-Prim1MCU	NO	3.01	3.01	0.0
	DT-Prim2MCU	NO	3.01	3.01	0.0
	DT-Sec1MCU	NO	3.01	3.01	0.0
	DT-Sec2MCU	NO	3.01	3.01	0.0

Supported Transceiver Modules

To determine the transceivers that Cisco hardware device supports, refer to the Transceiver Module Group (TMG) Compatibility Matrix tool.

Other Important Information

- The warning message that the smart licensing evaluation period has expired is displayed in the console every hour. There is, however, no functionality impact on the device. The issue is seen on routers that don't have the Flexible Consumption licensing model enabled. To stop the repetitive messaging, register the device with the smart licensing server and enable the Flexible Consumption model. Later load a new registration token.

  To register the device with the smart licensing server, see the Registering and Activating Your Router.

Related Documentation

The most current Cisco 8000 router documentation is located at the following URL:

https://www.cisco.com/c/en/us/td/docs/iosxr/8000-series-routers.html

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