



Release Notes for Cisco 8000 Series Routers, IOS XR Release 7.7.1

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Cisco 8100, 8200, and 8800 Series Routers

What's New in Cisco IOS XR Release 7.7.1

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	<p>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.</p> <p>As we continue to enhance the tool, we would love to hear your feedback. You are welcome to drop us a note here.</p>
Use Case-based Documentation at Learning Labs	<p>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.</p> <p>Check out the new interactive documentation here:</p> <ul style="list-style-type: none">• End to end 3-stage CLOS Networks for SONiC• Use cases for QoS and Model-driven Telemetry

Software Features Enhanced and Introduced

To learn about features introduced in other Cisco IOS XR releases, select the release from the [Documentation Landing Page](#).

Feature	Description
BGP	
Convergence for BGP Labeled Unicast PIC Edge	This feature improves the convergence time of BGP labeled unicast (LU) routes to subseconds when an ingress provider edge router fails or loses PE router connectivity, and another PE router needs to be connected. This feature minimizes traffic drops when the primary paths fail for the BGP LU routes.
L2VPN	

Feature	Description
VPWS over SR-TE Policy	<p>Using the SR-TE policy, you can now set the preferred path between two endpoints for Virtual Private Wire Service (VPWS). This gives you the advantage of a reduced number of dedicated networks to provision IP and VPN services across SR-TE tunnels.</p> <p>The VPWS is a method to provide Ethernet-based point to point communication over MPLS or IP networks.</p>
Modular QoS	
Egress L2 Classification and Marking	You can now perform packet remarking on Layer 2 subinterfaces. Traffic marking allows you to fine tune the traffic attributes on your network. The increased granularity helps single out traffic that requires special handling, and achieves optimal application performance.
QoS Support for VPWS	<p>Now, you can apply QoS packet classification on Layer 2 subinterfaces, and for VPWS traffic. This feature provides ingress classification support for L2 attachment circuit (AC) traffic based on the 802.1p field priority value.</p> <p>With this feature, you can use QoS policies on VPWS traffic in your network on Cisco 8000 Series routers.</p>
Routing	
Setting SPF interval in IS-IS to postpone the IS-IS SPF computations	<p>You can now define a standard algorithm to postpone the IS-IS SPF computations by setting an SPF interval. This reduces the computational load and churn on IGP nodes when multiple temporally close network events trigger multiple SPF computations.</p> <p>This algorithm also reduces the probability and the duration of transient forwarding loops during native IS-IS convergence when the protocol reacts to multiple temporally close events.</p> <p>This feature complies with RFC 8405.</p> <p>This feature introduces the <code>spf-interval ietf</code> command.</p>
System Security	
Password Policy to Restrict Consecutive Characters	<p>We have enhanced the router security by enforcing a strong password policy for all users configured on the router. You can now specify a new password policy for the user that restricts the usage of a specific number of consecutive characters for the login passwords. These characters include English alphabets, the sequence of QWERTY keyboard layout, and numbers, such as, 'abcd', 'qwer', '1234', and so on. Apart from <i>passwords</i>, the feature is also applicable for <i>secrets</i>—the one-way encrypted secure login passwords that are not easy to decrypt to retrieve the original unencrypted password text.</p> <p>The password policy is applicable only for the users configured on the local AAA server on the router; not those configured on the remote AAA server.</p> <p>The feature introduces the <code>restrict-consecutive-characters</code> command.</p>

YANG Data Models Introduced and Enhanced

This release introduces or enhances the following data models. For detailed information about the supported and unsupported sensor paths of all the data models, see the [Github](#) repository. To get a comprehensive list of the data models supported in a release, navigate to the **Available-Content.md** file for the release in the Github repository. The unsupported sensor paths are documented as deviations. For example, `openconfig-acl.yang` provides details about the supported sensor paths, whereas `cisco-xr-openconfig-acl-deviations.yang` provides the unsupported sensor paths for `openconfig-acl.yang` on Cisco IOS XR routers.

Feature	Description
Programmability	

Feature	Description
openconfig-isis Revision 0.6.0	

Feature	Description
	<p>The OpenConfig data model supports to monitor the system performance by checking the packet counter statistics and bandwidth, time, length, and values (TLVs) of IS-IS database using the following XPaths:</p> <ul style="list-style-type: none"> • <code>interfaces/interface[interface-id]/bfd/config/bfd-tlv</code> • <code>global/state/authentication-check</code> • <code>global/state/maximum-area-addresses</code> • <code>global/state/poi-tlv</code> • <code>global/state/iid-tlv</code> • <code>global/graceful-restart/state/helper-only</code> <p>Root path for system-level counters: <code>levels/level[levelnumber]/system-level-counters/state/</code></p> <ul style="list-style-type: none"> • <code>manual-address-drop-from-areas</code> • <code>part-changes</code> • <code>auth-fails</code> • <code>auth-type-fails</code> <p>Root path for TLV type extended-is-reachability counters:</p> <p><code>levels/level[level-number]/link-state-database/lsp[lsp-id]/tlvs/tlv[type]/extended-is-reachability/neighbors/neighbor[system-id]/instances/instance[id]/subtlvs/subtlv[type]/</code></p> <p>Root path for mt-isn counters:</p> <p><code>levels/level[level-number]/link-state-database/lsp[lsp-id]/tlvs/tlv[type]/mt-isn/neighbors/neighbor[mt-idsystem-id]/instances/instance[id]/subtlvs/subtlv[type]/</code></p> <p>extended-is-reachability and mt-isn TLV counters:</p> <ul style="list-style-type: none"> • <code>link-id/state/local</code> • <code>link-id/state/remote</code> • <code>link-delay/state/a-bit</code> • <code>link-delay/state/delay</code> • <code>min-max-link-delay/state/a-bit</code> • <code>min-max-link-delay/state/min-delay</code> • <code>min-max-link-delay/state/max-delay</code> • <code>link-delay-variation/state/delay</code> • <code>link-loss/state/a-bit</code> • <code>link-loss/state/link-loss</code> • <code>residual-bandwidth/state/bandwidth</code> • <code>available-bandwidth/state/type</code> • <code>available-bandwidth/state/bandwidth</code>

Feature	Description
	<ul style="list-style-type: none"> • utilized-bandwidth/state/type • utilized-bandwidth/state/bandwidth <p>Root path for circuit-counters: interfaces/interface[interfaceid]/circuitcounters/state/</p> <ul style="list-style-type: none"> • init-fails • auth-type-fails • adj-number <p>Root path for packet counters: interfaces/interface[interfaceid]/levels/level[levelnumber]/packetcounters/</p> <ul style="list-style-type: none"> • lsp/state/dropped • lsp/state/retransmit • iih/state/dropped • iih/state/retransmit • psnp/state/dropped • psnp/state/retransmit • csnp/state/dropped • csnp/state/retransmit • unknown/state/received • unknown/state/processed • unknown/state/dropped • unknown/state/sent • unknown/state/retransmit <p>Following statistics always displays the value as ZERO.</p> <ul style="list-style-type: none"> • interfaces/interface[interface-id]/circuit-counters/state/init-fails • levels/level[level-number]/system-level-counters/state/auth-type-fails • interfaces/interface[interface-id]/levels/level[level-number]/packet-counters/iih/state/retransmit • interfaces/interface[interface-id]/levels/level[level-number]/packet-counters/csnp/state/retransmit • interfaces/interface[interface-id]/levels/level[level-number]/packet-counters/psnp/state/retransmit • interfaces/interface[interface-id]/levels/level[level-number]/packet-counters/unknown/state/sent • interfaces/interface[interface-id]/levels/level[level-number]/packet-counters/unknown/state/retransmit <p>This feature introduces authentication-check disable command to disable authentication check.</p>

Feature	Description
openconfig-platform-transceiver Revision 0.7.0	<p>The OpenConfig data model configures the mapping of optical channel with the configured physical channel, and physical port with the configured interface using the following XPathS:</p> <ul style="list-style-type: none"> • openconfig-platform/openconfig-platform-transceiver/ transceiver • openconfig-platform/openconfig-platform-transceiver/ physical-channels/channel[index]/config/ associated-optical-channel • openconfig-platform/openconfig-platform-transceiver/ physical-channels/channel[index]/state/ associated-optical-channel
openconfig-terminal-device Revision 1.7.2	<p>The OpenConfig data model configures terminal optics devices up to 400G bandwidth to manage the line side terminal systems in a Dense wavelength-division multiplexing (DWDM) transport network using the following XPathS:</p> <ul style="list-style-type: none"> • openconfig-terminal-device:terminal-device/logical-channels/channel • openconfig-terminal-device:terminal-device/optical-channels/channel
OpenConfig Model: openconfig-inet-types Version 0.4.1	<p>We have now revised the openconfig-inet-types open configuration from version 0.3.1 to 0.4.1. With this revision, this data model supports autogenerated regular expressions for faster validation of text strings for the following IPv4 pattern statements:</p> <ul style="list-style-type: none"> • ipv4-address • ipv4-address-zoned • ipv4-prefix <p>You can access the OC data model from the Github repository.</p>

Hardware Introduced

Cisco IOS XR Release 7.7.1 introduces the following hardware support:

Hardware Feature	Description
Optics	<p>Note: Optics support varies across devices (routers, line cards, RPs, and so on). To know if an optics is compatible with a specific Cisco device, refer to the Transceiver Module Group (TMG) Compatibility Matrix.</p> <p>This release introduces the following optics:</p> <ul style="list-style-type: none"> • Cisco 100GBASE Quad Small Form-Factor Pluggable (QSFP) <ul style="list-style-type: none"> • QSFP-100G-LR-S • QSFP-100G-PSM4-S • Cisco 400GBASE Quad Small Form-Factor Pluggable Double Density (QSFP-DD) <ul style="list-style-type: none"> • QDD-4X100G-LR-S • QDD-400G-LR4-S • Cisco 10GBASE SFP+ Modules <ul style="list-style-type: none"> • SFP-10G-SR-S • SFP-10G-ER-S

For a complete list of supported hardware and ordering information, see the [Cisco 8000 Series Data Sheet](#).

Release 7.7.1 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                                             7.7.1v1.0.0-1
xr-8000-aib                                               7.7.1v1.0.0-1
xr-8000-bfd                                               7.7.1v1.0.0-1
xr-8000-buffhdr-ea                                        7.7.1v1.0.0-1
xr-8000-bundles                                           7.7.1v1.0.0-1
xr-8000-card-support                                     7.7.1v1.0.0-1
xr-8000-cdp-ea                                            7.7.1v1.0.0-1
xr-8000-cfm                                               7.7.1v1.0.0-1
xr-8000-core                                              7.7.1v1.0.0-1
xr-8000-cpa                                               7.7.1v1.0.0-1
xr-8000-cpa-devobj-misc                                  7.7.1v1.0.0-1
```

xr-8000-cpa-npu	7.7.1v1.0.0-1
xr-8000-cpa-sb-data	7.7.1v1.0.0-1
xr-8000-dot1x	7.7.1v1.0.0-1
xr-8000-dsm	7.7.1v1.0.0-1
xr-8000-encap-id	7.7.1v1.0.0-1
xr-8000-ether-ea	7.7.1v1.0.0-1
xr-8000-fabric	7.7.1v1.0.0-1
xr-8000-feat-mgr	7.7.1v1.0.0-1
xr-8000-fib-ea	7.7.1v1.0.0-1
xr-8000-forwarder	7.7.1v1.0.0-1
xr-8000-fpd	7.7.1v1.0.0-1
xr-8000-fwd-tools	7.7.1v1.0.0-1
xr-8000-fwplib	7.7.1v1.0.0-1
xr-8000-host-core	7.7.1v1.0.0-1
xr-8000-l2fib	7.7.1v1.0.0-1
xr-8000-l2mcast	7.7.1v1.0.0-1
xr-8000-leabaofa	7.7.1v1.0.0-1
xr-8000-libofaasync	7.7.1v1.0.0-1
xr-8000-lpts-ea	7.7.1v1.0.0-1
xr-8000-mcast	7.7.1v1.0.0-1
xr-8000-netflow	7.7.1v1.0.0-1
xr-8000-npu	7.7.1v1.0.0-1
xr-8000-oam	7.7.1v1.0.0-1
xr-8000-optics	7.7.1v1.0.0-1
xr-8000-os	7.7.1v1.0.0-1
xr-8000-os-extra	7.7.1v1.0.0-1
xr-8000-pbr	7.7.1v1.0.0-1
xr-8000-pfilter	7.7.1v1.0.0-1
xr-8000-pidb	7.7.1v1.0.0-1
xr-8000-pktio	7.7.1v1.0.0-1
xr-8000-port-mapper	7.7.1v1.0.0-1
xr-8000-port-mode	7.7.1v1.0.0-1
xr-8000-ppinfo	7.7.1v1.0.0-1
xr-8000-qos-ea	7.7.1v1.0.0-1
xr-8000-span	7.7.1v1.0.0-1
xr-8000-spio	7.7.1v1.0.0-1
xr-8000-spp-ea	7.7.1v1.0.0-1
xr-8000-timing	7.7.1v1.0.0-1
xr-8000-tunnel-ip	7.7.1v1.0.0-1
xr-8000-utapp-blaze	7.7.1v1.0.0-1
xr-8000-vether	7.7.1v1.0.0-1
xr-8000-ztp-ea	7.7.1v1.0.0-1
xr-aaa	7.7.1v1.0.0-1
xr-acl	7.7.1v1.0.0-1
xr-apphosting	7.7.1v1.0.0-1
xr-appmgr	7.7.1v1.0.0-1
xr-bcdl	7.7.1v1.0.0-1
xr-bfd	7.7.1v1.0.0-1
xr-bgp	7.7.1v1.0.0-1
xr-bgputil	7.7.1v1.0.0-1
xr-bng-stubs	7.7.1v1.0.0-1
xr-bundles	7.7.1v1.0.0-1
xr-cal-pi	7.7.1v1.0.0-1
xr-cdp	7.7.1v1.0.0-1
xr-cds	7.7.1v1.0.0-1
xr-cfgmgr	7.7.1v1.0.0-1
xr-cfm	7.7.1v1.0.0-1
xr-cofo	7.7.1v1.0.0-1
xr-core	7.7.1v1.0.0-1
xr-core-calv	7.7.1v1.0.0-1
xr-cpa-common	7.7.1v1.0.0-1
xr-cpa-common-optics	7.7.1v1.0.0-1
xr-cpa-common-psu	7.7.1v1.0.0-1
xr-cpa-driver-devobj-gnss	7.7.1v1.0.0-1

xr-cpa-driver-devobj-misc	7.7.1v1.0.0-1
xr-cpa-driver-devobj-npu	7.7.1v1.0.0-1
xr-cpa-driver-devobj-phy	7.7.1v1.0.0-1
xr-cpa-driver-devobj-sensors	7.7.1v1.0.0-1
xr-cpa-driver-devobj-storage	7.7.1v1.0.0-1
xr-cpa-driver-devobj-test	7.7.1v1.0.0-1
xr-cpa-driver-devobj-timing	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-access	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-common	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-infra	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-kmod	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-misc	7.7.1v1.0.0-1
xr-cpa-driver-fpgalib-optics	7.7.1v1.0.0-1
xr-cpa-driver-optics	7.7.1v1.0.0-1
xr-cpa-ethsw	7.7.1v1.0.0-1
xr-cpa-idprom	7.7.1v1.0.0-1
xr-cpa-tamlib	7.7.1v1.0.0-1
xr-ctc	7.7.1v1.0.0-1
xr-debug	7.7.1v1.0.0-1
xr-dhcp	7.7.1v1.0.0-1
xr-diags	7.7.1v1.0.0-1
xr-diskboot	7.7.1v1.0.0-1
xr-drivers	7.7.1v1.0.0-1
xr-eem	7.7.1v1.0.0-1
xr-elmi-stubs	7.7.1v1.0.0-1
xr-ema	7.7.1v1.0.0-1
xr-enhancedmanageability	7.7.1v1.0.0-1
xr-featurecapability	7.7.1v1.0.0-1
xr-fib	7.7.1v1.0.0-1
xr-filesysinv	7.7.1v1.0.0-1
xr-foundation-8000	7.7.1v1.0.0-1
xr-fpd	7.7.1v1.0.0-1
xr-ha-infra	7.7.1v1.0.0-1
xr-healthcheck	7.7.1v1.0.0-1
xr-host-core	7.7.1v1.0.0-1
xr-httpclient	7.7.1v1.0.0-1
xr-icpe-eth	7.7.1v1.0.0-1
xr-icpe-opt	7.7.1v1.0.0-1
xr-identifier	7.7.1v1.0.0-1
xr-infra-sla	7.7.1v1.0.0-1
xr-install	7.7.1v1.0.0-1
xr-ip-apps	7.7.1v1.0.0-1
xr-ip-core	7.7.1v1.0.0-1
xr-ip-infra-vrf	7.7.1v1.0.0-1
xr-ip-mibs	7.7.1v1.0.0-1
xr-ip-static	7.7.1v1.0.0-1
xr-ipc	7.7.1v1.0.0-1
xr-ipsla	7.7.1v1.0.0-1
xr-is-is	7.7.1v1.0.0-1
xr-k9sec	7.7.1v1.0.0-1
xr-l2snooptransport	7.7.1v1.0.0-1
xr-l2vpn	7.7.1v1.0.0-1
xr-ldp	7.7.1v1.0.0-1
xr-licensing	7.7.1v1.0.0-1
xr-link-oam	7.7.1v1.0.0-1
xr-linuxnetworking	7.7.1v1.0.0-1
xr-linuxsecurity	7.7.1v1.0.0-1
xr-lldp	7.7.1v1.0.0-1
xr-lpts	7.7.1v1.0.0-1
xr-manageabilityxml	7.7.1v1.0.0-1
xr-mandatory	7.7.1v1.0.0-1
xr-mcast	7.7.1v1.0.0-1
xr-mcastl2snoop	7.7.1v1.0.0-1
xr-mda	7.7.1v1.0.0-1

xr-mppls	7.7.1v1.0.0-1
xr-mppls-oam	7.7.1v1.0.0-1
xr-mppls-oam-client	7.7.1v1.0.0-1
xr-mppls-static	7.7.1v1.0.0-1
xr-netflow	7.7.1v1.0.0-1
xr-networkboot	7.7.1v1.0.0-1
xr-nosi	7.7.1v1.0.0-1
xr-ntp	7.7.1v1.0.0-1
xr-ofa	7.7.1v1.0.0-1
xr-optics	7.7.1v1.0.0-1
xr-orrsppf	7.7.1v1.0.0-1
xr-os-apps	7.7.1v1.0.0-1
xr-os-core	7.7.1v1.0.0-1
xr-os-hardware	7.7.1v1.0.0-1
xr-ospf	7.7.1v1.0.0-1
xr-p4rt	7.7.1v1.0.0-1
xr-perf-meas	7.7.1v1.0.0-1
xr-perfmgmt	7.7.1v1.0.0-1
xr-pfi	7.7.1v1.0.0-1
xr-pird-stubs	7.7.1v1.0.0-1
xr-pkt-trace	7.7.1v1.0.0-1
xr-platforms-ras	7.7.1v1.0.0-1
xr-pm-alarm	7.7.1v1.0.0-1
xr-procmgr	7.7.1v1.0.0-1
xr-python	7.7.1v1.0.0-1
xr-qos	7.7.1v1.0.0-1
xr-rid-mgr	7.7.1v1.0.0-1
xr-routing	7.7.1v1.0.0-1
xr-rpl	7.7.1v1.0.0-1
xr-rsvp-te	7.7.1v1.0.0-1
xr-security	7.7.1v1.0.0-1
xr-security-tams	7.7.1v1.0.0-1
xr-secy-driver	7.7.1v1.0.0-1
xr-servicelayer	7.7.1v1.0.0-1
xr-snmp	7.7.1v1.0.0-1
xr-snmp-hw	7.7.1v1.0.0-1
xr-span	7.7.1v1.0.0-1
xr-spi-core	7.7.1v1.0.0-1
xr-spi-hw	7.7.1v1.0.0-1
xr-spp	7.7.1v1.0.0-1
xr-sr	7.7.1v1.0.0-1
xr-stats	7.7.1v1.0.0-1
xr-stp	7.7.1v1.0.0-1
xr-stubs	7.7.1v1.0.0-1
xr-sysdb	7.7.1v1.0.0-1
xr-syslog	7.7.1v1.0.0-1
xr-telemetry	7.7.1v1.0.0-1
xr-telnet	7.7.1v1.0.0-1
xr-timing	7.7.1v1.0.0-1
xr-tmpdir-cleanup	7.7.1v1.0.0-1
xr-track	7.7.1v1.0.0-1
xr-transport	7.7.1v1.0.0-1
xr-tty	7.7.1v1.0.0-1
xr-tunnel-ip	7.7.1v1.0.0-1
xr-tunnel-nve	7.7.1v1.0.0-1
xr-upgradematrix	7.7.1v1.0.0-1
xr-utils	7.7.1v1.0.0-1
xr-vether	7.7.1v1.0.0-1
xr-vpnmib	7.7.1v1.0.0-1
xr-xmlinfra	7.7.1v1.0.0-1
xr-xrllibcurl	7.7.1v1.0.0-1
xr-ztp	7.7.1v1.0.0-1

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

Table 1: Cisco 8000 Series Router Specific Bugs

Bug ID	Headline
CSCwc57811	envmon process crash at 'spi_envmon_handle_pem_oir' after power module physical removal
CSCwc44263	2 hcmgr_collector collectors are not running after healthcheck disable/enable

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 7.7.1 LNT
Copyright (c) 2013-2022 by Cisco Systems, Inc.

Build Information:
  Built By      : ingunawa
  Built On     : Mon Jul 25 06:07:25 UTC 2022
  Build Host   : iox-ucs-060
  Workspace    : /auto/srcarchive12/prod/7.7.1/8000/ws
  Version     : 7.7.1
  Label       : 7.7.1

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, 10 minutes
Cisco 8808 8-slot Chassis
```

Determine Firmware Support

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

Cisco 8100 Series Router

```
RP/0/RP0/CPU0# show fpd package
=====
                          Field Programmable Device Package
=====
```

Card Type	FPD Description	Req Reload	SW Ver	Min Req SW Ver	Min Req Board Ver
8101-32FH	Bios	YES	1.03	1.03	0.0
	BiosGolden	YES	1.03	0.13	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35
	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0
8101-32FH-O	Bios	YES	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35
	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0
8201-24H8FH	Bios	YES	1.03	1.03	0.0
	BiosGolden	YES	1.03	0.13	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35
	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0
8201-24H8FH-O	Bios	YES	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35
	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0
8201-32FH	Bios	YES	1.03	1.03	0.0
	BiosGolden	YES	1.03	0.13	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35

	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0

8201-32FH-O	Bios	YES	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	0.0
	IoFpga	YES	1.04	1.04	0.35
	IoFpgaGolden	YES	1.04	1.02	0.35
	PowerCpld	YES	1.04	1.04	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	1.21	1.21	0.35
	x86FpgaGolden	YES	1.21	1.06	0.35
	x86TamFw	YES	6.05	6.05	0.0
	x86TamFwGolden	YES	6.05	6.05	0.0

PSU1.4KW-ACPE	DT-PrimMCU	NO	3.01	3.01	0.0
	DT-SecMCU	NO	2.02	2.02	0.0

PSU1.4KW-ACPI	DT-PrimMCU	NO	3.01	3.01	0.0
	DT-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

PSU2KW-HVPI	PO-PrimMCU	NO	17.136	17.136	0.0

Cisco 8200 Series Router

RP/0/RP0/CPU0# show fpd package

```

=====
                        Field Programmable Device Package
=====

```

Card Type	FPD Description	Req Reload	SW Ver	Min Req SW Ver	Min Req Board Ver

8201	Bios	YES	1.23	1.23	0.0
	BiosGolden	YES	1.23	1.15	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

88-LC0-34H14FH	Bios	YES	1.03	1.03	0.0
	BiosGolden	YES	1.03	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	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	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	1.03	1.03	0.0
	BiosGolden	YES	1.03	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	1.15	1.15	0.1
	x86FpgaGolden	YES	1.15	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	1.03	1.03	0.0
	BiosGolden	YES	1.03	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	1.15	1.15	0.1
	x86FpgaGolden	YES	1.15	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	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	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	1.15	1.15	0.1
	x86FpgaGolden	YES	1.15	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	0.219	0.219	0.0
	BiosGolden	YES	0.219	0.219	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	1.15	1.15	0.1
	x86FpgaGolden	YES	1.15	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	1.23	1.23	0.0
	BiosGolden	YES	1.23	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	1.23	1.23	0.0
	BiosGolden	YES	1.23	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	1.23	1.23	0.0
	BiosGolden	YES	1.23	1.15	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	1.31	1.31	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
	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	1.31	1.31	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-RP2	Bios	YES	1.00	1.00	0.0
	BiosGolden	YES	1.00	1.00	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	0.08	0.08	0.0
	TimingFpgaGolden	YES	0.08	0.08	0.0
	x86Fpga	YES	0.59	0.58	0.0
	x86FpgaGolden	YES	0.59	0.58	0.0

	x86TamFw	YES	7.09	7.09	0.0
	x86TamFwGolden	YES	7.09	7.09	0.0
8800-RP2-E	Bios	YES	1.00	1.00	0.0
	BiosGolden	YES	1.00	1.00	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	0.08	0.08	0.0
	TimingFpgaGolden	YES	0.08	0.08	0.0
	x86Fpga	YES	0.59	0.58	0.0
	x86FpgaGolden	YES	0.59	0.58	0.0
	x86TamFw	YES	7.09	7.09	0.0
	x86TamFwGolden	YES	7.09	7.09	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
8808-FC1	IoFpga	YES	0.11	0.11	0.0
	IoFpgaGolden	YES	0.11	0.11	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
PSU4.8KW-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

Important Notes

- 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](#).

- When you execute the **show tech-support** command, a temporary directory is created and the related data is stored in this directory. This directory is deleted after the command is completed. For example,

```
Router#run ls -ltr
drwxrwxrwx. 3 root root show-tech-fabric-link-incl-loca-010cpu0_2.tgz
```

In case, you terminate the **show tech-support** command manually, we recommend you to delete the corresponding show tech directory if not needed.

Supported Transceiver Modules

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

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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