Release Notes for Cisco 8000 Series Routers, IOS XR Release 7.10.1

Revised: September 18, 2024

Cisco 8100, 8200, 8600, and 8800 Series Routers

What's New in Cisco IOS XR Release 7.10.1

For more details on the Cisco IOS XR release model and associated support, see Software Lifecycle Support Statement - IOS XR.

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 Enhanced and Introduced

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

Feature	Description
Cisco IOS XR to SONiC OS Migration	
Securely migrate from Cisco IOS XR to SONiC	As part of Cisco's commitment to disaggregate hardware and software components and provide an open-source network, we have now enabled the infrastructure to securely migrate the network operating system from Cisco IOS XR to SONiC. This migration will ensure secure access to devices and integrity of software images to prevent software modification using unauthorized third-party images. While only the infrastructure is enabled in this release, the SONiC migration image will be available in the upcoming release.

Feature	Description
Setup and Upgrade	
Improved Traceability for Firmware Upgrade with User Name Display	We have made it easier for you to trace any firmware upgrade activity by enabling traceability of the user who performed the upgrade. This feature is enabled by default.
Firmware Upgrade without restarting the device	With this release, you may now perform a firmware upgrade on QDD-400G-ZRP-S and 400G QSFP-DD ZR without having to restart the device. This feature is enabled by default.
9600 Baud Rate on Cisco 8100 Series Routers Consoles	With this release, select variants of Cisco 8100 Series Routers support a 9600 baud rate on the console. You can deploy devices with this baud rate in networks where the async terminal baud rate is 9600. Previously, the supported baud rate was 115200. This rate is configured by default and supported on: • 8101-32H • 8102-64H • 8101-32FH
Display SSHD process information in the bootup logs	We have updated the bootup logs on the router to display the information of SSHD process. The SSHD process is a part of the Cisco IOS XR ISO installation service. The updated bootup log message is: *Starting IOS-XR ISO Installation including sshd...* *[OK] IOS-XR ISO Installation including sshd.*
Telemetry	
FQDN as the gRPC Tunnel Destination	You can now specify a fully qualified domain name (FQDN) as gRPC tunnel destination. FQDNs are easy to remember compared to numeric IP addresses and helps to resolve the domain names to IPv4 or IPv6 address and establish tunnel towards the destination. Model-driven telemetry and Event-driven telemetry are supported. The feature introduces these changes: **CLI:** • The keywords **address-family ipv4** and **address-family ipv6** are introduced in the **gRPC tunnel** command.

Feature	Description
Virtual Address as the Source IP Address of gRPC Tunnel	You can now configure a virtual address as the source IP address of gRPC tunnel. Since the virtual address refers to whichever management interface is currently active, a route processor (RP) card fail-over is managed with ease and disruptions are minimized. Model-driven telemetry and Event-driven telemetry are supported. The feature introduces these changes: **CLI:** • The keywords **source ipv4 virtual address** and **source ipv6 virtual address** are introduced in the **gRPC tunnel** command.
Programmability	
Improved YANG Input Validator and Get Requests	The OpenConfig data models provide a structure for managing networks via YANG protocols. With this release, enhancements to the configuration architecture improve input validations and ensure that the Get requests made through gNMI or NETCONF protocols return only explicitly configured OpenConfig leaves.
P4Runtime to Manage Traffic Operations	With this release, the router supports Programming Protocol-Independent Packet Processors Runtime (P4), a gRPC-based service, to program the data plane elements for network operations such as sending and receiving packets between the router and the P4Runtime controller using packet I/O messages. This feature introduces the following commands: **CLI:** • **grpc p4rt** • **grpc p4rt interface** • **grpc p4rt location** • **show p4rt devices** • **show p4rt interfaces** • **show p4rt state** • **show p4rt stats** • **show p4rt trace** **YANG Data Model:** `openconfig-p4rt.yang` OpenConfig data model (see GitHub, YANG Data Models Navigator)
Prevent Partial Pseudo-Atomic Committed Configurations	You can now prevent the partially-committed configurations on the router and thus ensure the system database and OpenConfig datastore stay in sync. This feature changes how the internal rollback error is handled when a pseudo-atomic commit fails. In such cases, the system database always rolls back the configuration in its datastore thereby ensuring that there is no partially-committed configuration. If there is still inconsistency, the system displays error messages to notify you of various internal rollback failure scenarios based on which you must take rectification action to re-synchronize the data.

Feature	Description
Routing	
Autonomous System Boundary Router Isolation and Adjacency Control for LSA Overflows	In a network employing an Autonomous System Boundary Router (ASBR) and other routers, you are now assured of uninterrupted traffic flow even if the ASBR generates LSAs that exceed the limit you configured. This is made possible as you can now isolate ASBRs and also control the duration of adjacency in the EXCHANGE or LOADING phase. By isolating the ASBR from its immediate neighbors, the remaining network topology can continue to function without disruption, effectively preventing any adverse impact on traffic flow. This approach also simplifies the recovery process, as manual intervention is only necessary for the immediate neighbors of the ASBR routers. This feature introduces these changes: **CLI:** • **`max-external-lsa`** • **`exchange-timer`** **YANG Data Model:** • `Cisco-IOS-XR-ipv4-ospf-cfg.yang` • `Cisco-IOS-XR-ipv4-ospf-oper.yang` • `Cisco-IOS-XR-um-router-ospf-cfg.yang` (see GitHub, YANG Data Models Navigator)
Bidirectional Forwarding Detection on BVI	Now you can extend the advantage of low-overhead and short-duration detection of path failures between routers to an Integrated Routing and Bridging (IRB) deployment scenario by configuring Bidirectional Forwarding Detection (BFD) on multipath single-hop sessions using Bridge-Group Virtual Interface (BVI). By configuring BFD on a multipath session, you can apply BFD over virtual interfaces or between interfaces that are multiple hops away.

Feature	Description
Disable IID-TLV of IS-IS Protocol Instance	You can now disable Instance Identifier Type-Length-Value (IID-TLV) in the Hello and LSP packets when multiple IS-IS protocol instances are configured on the router. Each IS-IS instance has a unique instance-ID set, the TLV of which is sent in the Hello and LSP packets. The IID-TLV attribute helps in uniquely identifying the IS-IS protocol instance as well as the topologies to which the Protocol Data Units (PDUs) apply. The feature introduces these changes: **CLI** New Command: • **iid disable** Modified Commands: • The **hello-padding** command is extended to IS-IS process configuration mode • The **disable (IS-IS)** command is modified with a new **level** keyword, and also extended to interface configuration mode. **YANG Data Model** • New XPaths for `openconfig-isis.yang` (see GitHub, YANG Data Models Navigator)
Segment Routing	
Configurable Filters for IS-IS Advertisements to BGP-Link State	This feature allows you to configure a route map to filter IS-IS route advertisements to BGP-Link State (LS). It also provides a per-area configuration knob to disable IS-IS advertisements for external and propagated prefixes. This configuration of filters hence reduces the amount of redundant data for external and interarea prefixes sent to the BGP - LS clients. The feature introduces **exclude-external** , **exclude-interarea** , and **route-policy** *name* optional keywords in the **distribute link-state** command.

Feature	Description
IS-IS Partition Detection and Leakage of Specific Route Advertisements	In an open ring topology, a single fiber cut may partition the area or domain into two pieces. With summarization enabled, the area (domain) partition may result in traffic drops. Depending on the configuration in the Area Border Routers (ABRs) or Autonomous System Boundary Routers (ASBRs) that is picked as an entry point to the partitioned area (domain), the traffic is delivered to its destination or dropped as unreachable at ABR or ASBR. IS-IS partition detection and leakage of specific route advertisements features are introduced to retain connectivity for the partitioned area (domain) when summarization is used. The ABRs or ASBRs detect a network partition within an area (domain) and upon detection, ensure that the summary route is replaced with specific route advertisements in IS-IS. The following command and keyword are introduced: The feature introduces these changes: **New Command:** • **partition-detect** **Modified Command:** • The **partition-repair** keyword is introduced in the **summary-prefix** command. **YANG Data Model:** • New XPaths for `Cisco-IOS-XR-um-router-isis-cfg.yang` (see GitHub, YANG Data Models Navigator)
Label Distribution Protocol over Segment Routing Policy	This feature extends the existing MPLS Label Distribution Protocol (LDP) address family neighbor configuration to specify an SR policy as the targeted end-point, thus integrating LDP over SR-TE in core networks and enabling interoperability between LDP and SR-capable devices. The feature introduces the **neighbor sr-policy** command.
Local ECMP Support on SRTE	This feature supports the top security identifier (SID) resolved route interior gateway protocol (IGP) path's weight to be used in relative weight computation of outgoing paths of the SRTE policy. Now ECMP supports SRTE and computes per-egress-path relative weight using underlay (IGP) weight from Forwarding Information Base (FIB) / Routing Information Base (RIB) in addition to Segment List (SL) weight and number of primary egress paths for SL. Thus, IGP load balancing required at individual paths is also maintained. This feature is enabled by default and no configuration changes are required.
Multicast VPN: Dynamic Tree-SID Multicast VPN IPv6	This feature allows Dynamic Tree Segment Identifier (Tree-SID) deployment where IPv6 Multicast payload is used for optimally transporting IP VPN multicast traffic over the provider network, using SR-PCE as a controller. This implementation supports IPv6 only for the Dynamic Tree-SID. Currently, the Static Tree-SID supports IPV4 payloads only, not the IPv6 payloads.

Feature	Description
Multicast: Cisco Nonstop Forwarding for Tree-SID	Starting from this release, Multicast Nonstop Forwarding supports Tree-SID (Tree Segment Identifier). This ensures that traffic forwarding continues without interruptions whenever the active RSP fails over to the standby RSP. This feature prevents hardware or software failures on the control plane from disrupting the forwarding of existing packet flows through the router for Tree-SID. Thus, ensuring improved network availability, network stability, preventing routing flaps, and no loss of user sessions while the routing protocol information is being restored. The feature modifies the **show mrib nsf private** command.
SRv6 Traffic Accounting	You can now enable the router to record the number of bytes transmitted on a specific egress interface for IPv6 traffic using the SRv6 locator counter. You can use this data to create deterministic data tools to anticipate and plan for future capacity planning solutions. This feature introduces or modifies the following changes: **CLI**: • **CLI**: **accounting prefixes ipv6 mode per-prefix per-nexthop srv6-locators** **YANG Data Models:** • `Cisco-IOS-XR-accounting-cfg` • `Cisco-IOS-XR-fib-common-oper.yang` (see GitHub, YANG Data Models Navigator)

Feature	Description
SRv6 Traffic Engineering	You can now control the traffic flows within the network by defining the explicit and dynamic paths for traffic flows using the Segment Identifier (SID) within the IPv6 packet header. Defining explicit and dynamic paths based on different attributes and constraints allow the router to optimize routing decisions and enhance resource utilization. SRv6-TE policies supports the following functionalities: • SRv6-TE with SRv6 micro-SIDs (uSIDs) • Explicit SRv6 policies • Automated steering for Layer 3-based BGP services (IPv4 L3VPN, IPv6 L3VPN, IPv4 BGP global, IPv6 BGP global) • SRv6-aware Path Computation Element (PCE) • PCEPv4 and PCEPv6 • Path computation optimization objectives (TE, IGP, latency) • Path computation constraints (affinity, disjointness) This feature introduces the following changes: **CLI:** • **policy srv6 locator** • **segment-routing traffic-eng srv6** • **srv6 locator** • **srv6 maximum-sid-depth** • **segment-lists segment-list** • **segment-lists srv6** **YANG Data Model:** • `Cisco-IOS-XR-segment-routing-ms-cfg` (see GitHub, YANG Data Models Navigator)
Static Route Traffic-Steering using SR-TE Policy	IPv4 and IPv6 static routes now leverage the SR policies to aid Segment Routing Traffic Engineering (SR-TE). This facilitates traffic steering because you can now configure IP Static Route with SR static policy.
BGP	

Feature	Description
EIBGP Policy-Based Multipath with Equal Cost Multipath and Default VRF	Now, with the inclusion of the default VRF in policy-based multipath selection, you gain control over traffic distribution and load-balancing capabilities across various BGP variations, including iBGP, eBGP, and eiBGP. This is achieved through the utilization of BGP communities, nexthops, and path types. Additionally, by employing the equal cost multipath (ECMP) option in eiBGP, this feature provides the capability to select ECMP across the iBGP paths chosen for eiBGP. The feature introduces these changes: **CLI:** The keywords **route-policy** and **equal-cost** are added to the command: **maximum-paths** **YANG Data Model:** • `Cisco-IOS-XR-um-router-bgp-cfg` (see GitHub, YANG Data Models Navigator)
Enabling BGP Flowspec for IPv6 Packet Length	Services such as end-to-end security, quality of service (QoS), and globally unique addresses are now supported for IPv6 packet lengths, which allows your networks to scale and provides them with global reachability. Support for IPv6 packet lengths also means that, in terms of the matching criteria, support for BGP Network Layer Reachability Information (BGP NLRI) type-10 flowspec for IPv6 is added. This feature introduces the following to enable BGP flowspec for IPv6 packet length: • **CLI**: Introduces the **hw-module profile flowspec ipv6-packet-len-enable** command. • **YANG Data Model**: New XPaths for Cisco-IOS-XR-um-8000-hw-module-profile-cfg.yang (see GitHub, YANG Data Models Navigator).
Exclusion of Label Allocation for Non-Advertised Routes	We have enabled better label space management and hardware resource utilization by making MPLS label allocation more flexible. This flexibility means you can now assign these labels to only those routes that are advertised to their peer routes, ensuring better label space management and hardware resource utilization. Prior to this release, label allocation was done regardless of whether the routes being advertised. This resulted in inefficient use of label space.

Feature	Description
Protection of Directly Connected EBGP Neighbors through Interface-Based LPTS Identifier	We have enhanced the network security for directly connected eBGP neighbors by ensuring that only packets originating from designated eBGP neighbors can traverse through a single interface, thus preventing IP spoofing. This is made possible because we've now added an interface identifier for Local Packet Transport Services (LPTS). LPTS filters and polices the packets based on the type of flow rate you configure. The feature introduces these changes: **CLI:** • **bgp lpts-secure-binding** **YANG Data Model:** • `Cisco-IOS-XR-um-router-bgp-cfg` (see GitHub, YANG Data Models Navigator)
Interface and Hardware Component	
Designate a Member Link as Unviable	Earlier, when a member link is added to an interface link bundle, the peer starts using the link as soon as the LACP communication is up. Sometimes, the hardware programming for the data-path does not get complete in this time resulting in packet loss without any notification to the source. You can now mark a member link as unviable to introduce a delay during which the link is treated as standby. By delaying the usage of the member link for data transmission, you can ensure that the link configuration is fully established, which enables successful data transmission. This feature introduces these changes: • **CLI: forwarding-unviable** • **YANG Data Model:** New XPath for `Cisco-IOS-XR-bundlemgr-oper` (see Github, YANG Data Models Navigator).
Extended Support for DP04QSDD-HE0 Optical Module	This release introduces support for the Cisco 400G QSFP-DD High-Power (Bright) Optical Module DP04QSDD-HE0, Ethernet Variant on the Cisco 8608 router.
IP Addresses and Services	
ACL Log Message Collection for Egress Traffic	We have made it easier for you to monitor ACL egress traffic, assess traffic load on an ACL, and troubleshoot issues. This is made possible by adding a **log** option to the ACEs that are associated with an interface and identify the packet counts matching the ACEs. With this log option, for an egress traffic, you can fetch information, such as access list number, packets permitted or denied, and source or destination addresses of the packets.
Authentication Header (AH) and Encapsulating Security Payload (ESP) Headers Support in User Managed Control Plane and Management Plane ACLs	We've enhanced our traffic security by introducing the Authentication Header (AH) and Encapsulating Security Payload (ESP) IPv6 headers in the IPv6 ACLs. While AH provides data integrity and data origin authentication, ESP is for data confidentiality. You can configure ingress IPv6 ACL extensions for AH and ESP headers to permit or deny packets. These protocols ensure that the sensitive information travelling on the network reaches its destination safely.

Feature	Description
Egress Hybrid ACL Support	From this release onwards, you can apply compression levels for object-group ACLs, also known as hybrid ACLs, at the egress traffic. Because ACL compression optimizes TCAM space usage, it enables the router to accommodate additional ACLs or features.
MPLS	
MPLS MTU	You can now enforce the size of MPLS frames in your MPLS network by configuring the MPLS MTU of the MPLS interface. This enables interworking with routers from other vendors that have a strict MPLS MTU enforcement. When a transit packet exceeds the MPLS MTU, the router either fragments the packet or drops it. Cisco 8000 Series Routers and Line Cards with Cisco Silicon One Q200, Q201, or Q202 ASIC support this feature. In earlier releases, Cisco 8000 Series Routers didn't support MPLS MTU feature. While interworking with other routers that had MPLS MTU configured, the Cisco 8000 Series Router sent packets exceeding the MPLS MTU of those router interfaces. This resulted in packet drops at the peer routers. You can configure MPLS MTU with either CLI or YANG data model: **CLI:** • **mpls mtu** **YANG Data Model:** • `Cisco-IOS-XR-um-if-mpls-cfg.yang` (see GitHub, YANG Data Models Navigator)
Automatic Bandwidth Bundle TE++ for Numbered Tunnels	We have optimized network performance and enabled efficient utilization of resources for numbered tunnels based on real-time traffic by automatically adding or removing tunnels between two endpoints. This is made possible because this release introduces support for auto-bandwidth TE++ for numbered tunnels, expanding upon the previous support for only named tunnels, letting you define explicit paths and allocate the bandwidth to each tunnel. The feature introduces these changes: • **CLI:** The **auto-capacity** keyword is added to the **interface tunnel-te** command. • **YANG Data Model:** New XPaths for `Cisco-IOS-XR-mpls-te-cfg.yang` (see GitHub, YANG Data Models Navigator)
Netflow	

Feature	Description
sFlow Agent Address Assignment	You can now monitor traffic from a specific source by configuring the sFlow agent ID with the specific IPv4 or IPv6 address. Upon configuration, you can determine the source of the sFlow data. Earlier, by default, the sFlow agent ID had the source address of the sFlow export packet. The feature introduces these changes: **CLI** New Command: • **router-id** Modified Command: • The **show flow exporter-map** command is modified to display flow exporter map with router-id information. **YANG Data Model** • New XPaths for `openconfig-sampling-sflow.yang` (see GitHub, YANG Data Models Navigator)
System Security	
Display Username for Failed Authentication for Telnet Protocols	With this feature, we have enhanced the security of the routers and introduced better tracking functionality to the router. The failed authentication sys log now displays the details of users who tried to log in but failed due to authentication failure. With this feature provisioned, the router can now display the user ID of both SSH and Telnet protocols. In earlier releases, this feature was available only for SSH protocol. This feature introduces the following change: **CLI**: **aaa display-login-failed-users** . **YANG DATA Model**: New XPaths for `Cisco-IOS-XR-um-aaa-task-user-cfg` (see Github, YANG Data Models Navigator)
Extend Device Ownership	Your router can now run in a dual-ownership mode wherein you can securely migrate the operating system from Cisco IOS XR to third-party software such as SONiC. You can only install the signed SONiC image authorized by Cisco using an ownership voucher (OV) and authenticated variables (AV) on the router. This authorization prevents tampering with the software using unauthorized third-party images.
Multi-Tier Certificate Authority for Trustpoint Authentication	Apart from the root certificate authority (CA), you can now use a subordinate CA to issue certificates and authenticate your network devices. This feature is beneficial when you have an existing CA hierarchy where it is not the root CA but the subordinate CA that issues the leaf or router certificates. In earlier releases, you could associate only a single CA, not a multi-tier CA, to a trustpoint. And, you could use only the root CA certificate to enroll the router certificates. This feature modifies the **show crypto ca certificates** command to display the **Trusted Certificate Chain** field.

Feature	Description

Public Key-Based Authentication of SSH Clients on Cisco IOS XR Routers	You are now assured of cryptographic strength even as you avail of automated password-less login while establishing SSH connections with the server. With the password and keyboard-interactive authentication, Cisco IOS XR routers configured as SSH clients now support public key-based authentication. In this authentication method, passwords need not be sent over the network; hence, it provides an additional layer of security and aids in automation processes. This feature is available only for users locally configured on the router; not those configured on remote servers.
	
	Previous releases supported SSH public key-based authentication only for Cisco IOS XR routers configured as SSH servers.
	
	The feature introduces these changes:
	
	• **CLI**:
	  • **crypto key generate authentication-ssh rsa**
	  • **crypto key zeroize authentication-ssh rsa**
	  • **show crypto key mypubkey authentication-ssh rsa**
	
	• **Yang Data Models**:
	
	New Xpaths for:
	
	  • `Cisco-IOS-XR-crypto-act.yang`
	  • `Cisco-IOS-XR-crypto-cepki-new-oper.yang`
	
	(see GitHub, YANG Data Models Navigator)

System Management	
Auto-Save and Copy Router Configuration Using Public Key Authentication	You can now experience passwordless authentication while automatically saving running configurations and securely copying them on the router. The feature uses public key-based authentication, a secure logging method using a secure shell (SSH), which provides increased data security. This feature offers automatic authentication and single sign-on benefits, which also aids in a secure automation process. The feature introduces these changes: **CLI:** • The **configuration commit auto-save** command supports password-less authentication. • The **copy** command supports password-less authentication.

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.

You can also view the data model definitions using the YANG Data Models Navigator tool. This GUI-based and easy-to-use tool helps you explore the nuances of the data model and view the dependencies between various containers in the model. You can view

the list of models supported across Cisco IOS XR releases and platforms, locate a specific model, view the containers and their respective lists, leaves, and leaf lists presentedvisually in a tree structure.

Feature	Description
Programmability	
Cisco-IOS-XR-accounting-cfg	We have introduced this Cisco native data model to enable the router to record the amount of data transmitted between every pair of network routers using the SRv6 locator counter.
Cisco-IOS-XR-fib-common-oper	We have modified this Cisco native data model to view SRv6 locator counters.
Cisco-IOS-XR-crypto-act.yang	The following new leaves are added to this Cisco native data model to enable public key-based authentication of users on Cisco IOS XR routers that are configured as SSH clients: • `key-generate-authentication-ssh-rsa-keys` • `key-zeroize-authentication-ssh-rsa`
Cisco-IOS-XR-crypto-cepki-new-oper.yang	A new container, `auth-ssh-keys`, is added to this Cisco native data model to display the details of SSH RSA cryptographic keys that are used for public key-based authentication of users on Cisco IOS XR routers that are configured as SSH clients.
Cisco-IOS-XR-um-aaa-task-user-cfg	A new container, `display-login-failed-users`, is added to this Cisco unified data model to display username of the users who tried to log in to the router using invalid credentials, in the system logs.
openconfig-platform-port.yang Version 0.4.2	The OpenConfig data model is used to configure and retrieve operational data for the port components such as port breakouts, the number of interfaces using this breakout group and the number of lanes or physical channels assigned to the interfaces in this breakout group. You can stream Model-driven telemetry data for the operational state of the port components.
openconfig-ospfv2.yang Version 0.4.0	The OpenConfig data model is introduced as part of the openconfig-network-instance.yang data model to configure OSPF functionalities, such as multiple processes, areas, and interfaces. Event-driven telemetry and Model-driven telemetry are not supported.
openconfig-acl.yang Version 1.2.2	The OpenConfig data model is revised from version 1.2.0 to 1.2.2 to retrieve operational state data for network access control lists using YANG Get requests. You can now view the operational state data of the acl along with the packet matches. Model-driven telemetry data is supported.

Feature	Description
openconfig-isis.yang	The OpenConfig data model defines the configuration and state information related to ISIS protocol configuration running on a router. With this release, you can configure the following XPaths: openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/interfaces/interface/ • `config/hello-padding`: controls the padding type for IS-IS Hello PDUs. • `mpls/igp-ldp-sync/config/enabled`: synchronisation between the LDP and IS-IS. • `levels/level/hello-authentication/config/keychain`: refers to a keychain that should be used for hello authentication. • `enable-bfd/config/enabled`: when this leaf is set to true, BFD is used to detect the liveliness of the remote peer or next-hop. • `levels/level/config/enabled`: when set to true, the functionality within which this leaf is defined is enabled and when set to false it is explicitly disabled. openconfig-network-instance/network-instances/network-instance/protocols/protocol/isis/ • `global/mpls/igp-ldp-sync/config/enabled`: synchronization between the LDP and IS-IS. • `global/config/maximum-area-addresses`: supports maximum area. • `globalconfig/Iid-tlv`: (ISIS Instance Identifier TLV) when set to true, the IID-TLV identifies the unique instance as well as the topology/topologies to which the PDU applies. • `levels/level/authentication/config/keychain`: refers to the keychain that should be used for authenticating IS-IS packets. Event-driven and Model-driven telemetry is supported.

Feature	Description

openconfig-sampling-sflow.yang Version 1.1.0	The OpenConfig data model defines the sampling mechanisms implemented in an sFlow agent for monitoring traffic. This data model augments the openconfig-sampling.yang model. The model is revised from version 0.1.0 to 1.0.0 with the following XPaths:
	• `openconfig-sampling-sflow:sampling/sflow/config/`
	  • `agent-id-ipv4` and `agent-id-ipv6`: to configure the agent identifier (ID) with IPv4 or IPv6 address for all collectors. These XPaths are not mandatory. If they are not configured, then the router picks the `source-address` as the agent ID.
	  • `polling-interval`: to configure an interface counter polling-interval for all sFlow enabled interfaces.
	  • `ingress-sampling-rate` and `egress-sampling-rate`: to set the ingress and egress packet sampling rate respectively.
	  • `dscp`: DSCP marking of sFlow export packets generated by the sFlow subsystem on the network device.
	• `openconfig-sampling-sflow:sampling/sflow/collectors/collector/config/`
	  • `source-address`: to set the source IPv4 or IPv6 address for sFlow datagrams sent to sFlow collectors. In this release, the XPath is moved from the `config` container to `collectors` container. Upon configuration, the flow exporter-map associated with this collector gets the `source-address` configuration. Earlier, by default, the sFlow agent ID had the source address of the sFlow export packet.
	• `openconfig-sampling-sflow:sampling/sflow//interfaces/interface/config/`
	  • `ingress-sampling-rate` and `egress-sampling-rate`: to set the ingress and egress packet sampling rate respectively. In the absence of ingress sampling rate configuration at the interface level, the global `ingress-sampling-rate` will be used. For egress sampling on the interface, `egress-sampling-rate` must be used.
	Model-driven telemetry is supported.

Feature	Description
openconfig-system-grpc.yang Version 1.0.0	The OpenConfig data model is revised from version 0.1.1 to 1.0.0. This version enables the gRPC server to listen on any IP address bound to an interface and port of the system or listen for any specific list of IP addresses. The maximum number of supported IP addresses are 32, which may be IPv4 or IPv6, or both. Earlier, the gRPC server had the listen functionality for any IP address on the gRPC port but not to a specific list of listen addresses. Event-driven telemetry and Model-driven telemetry are supported.

Feature	Description
openconfig-system.yang Version 0.13.1	The OpenConfig data model is revised from version 0.12.0 to 0.13.1 to configure and retrieve the domain-name-server (DNS) processes running on the router. This version enables you to configure DNS processes using the following XPaths: openconfig-system:system/ • config/domain-name: Domain-name of the requested process • dns/servers/server/config/address: IP address of the DNS server (IPv4 or IPv6) • dns/host-entries/host-entry/config/ipv4-address: Host IPv4 addresses (up to 8 IPv4 addresses) • dns/host-entries/host-entry/config/ipv6-address: Host IPv4 addresses (up to 4 IPv6 addresses) • dns/host-entries/host-entry/config/hostname: Host-name for static DNS entry You can now collect the DNS processes information for one or more processes using Model-driven telemetry. This version enables you to collect information of DNS processes using the following XPaths: openconfig-system:system/ • state/domain-name • dns/servers/server/state/address • dns/host-entries/host-entry/state/ipv4-address • dns/host-entries/host-entry/state/ipv6-address • dns/host-entries/host-entry/state/hostname • dns/servers/server/state/port: Port number of DNS server (default value: 53) • dns/state/search: Ordered list of domains to search when resolving a host name

Feature	Description
openconfig-policy-forwarding.yang Version 0.5.0	This OpenConfig data model is part of the openconfig-network-instance.yang model that configures the actions to be performed on an inbound traffic when a packet matches the conditions defined in the policy-map. The OpenConfig data model is revised from version 0.4.0 to 0.5.0. This version introduces these changes: • New XPaths decapsulate-gue and decapsulate-gre are added for GUEv4 and GREv4 decapsulating actions respectively based on enhanced packet match criteria. The policy type should be PBR_POLICY. • The XPath /ipv4/config/protocol is extended to allow the two new values: UDP and GRE to enable GUEv4 and GREv4 configurations respectively. • An extended model, Cisco-IOS-XR-openconfig-policy-forwarding-ext.yang to manage the GUEv4 and GREv4 configurations. Model-driven telemetry is supported.
openconfig-platform-integrated-circuit.yang	The OpenConfig data model defines extensions to the OpenConfig platform model that apply to integrated circuit components. These components are generically forwarding NPUs or ASICs within the system for which the configuration or state is applicable. In this release, you can access a particular integrated circuit to know the available forwarding capacity across the backplane of NPUs or ASICs. The following XPaths helps to identify if there is an issue in the line card or any drop in traffic and steer the traffic out of the line card: openconfig-platform-integrated-circuit:/backplane-facing-capacity/state/ • Total • total-operational-capacity • consumed-capacity • available-pct Model-driven telemetry is supported.

Feature	Description

openconfig-qos.yang Version 0.x.0	The OpenConfig data model defines the configuration to avoid network congestion using queuing mechanism. The updated version of this model enables you to configure the priority schedulers and the queue of packets on the interface using the following XPaths:
	openconfig-qos/
	• scheduler-policies/scheduler-policy/schedulers/scheduler/inputs/input/config/weight: For priority schedulers, this indicates the priority of the corresponding input. Higher values indicate higher priority. For weighted round-robin schedulers, this leaf indicates the weight of the corresponding input.
	• queue-management-profiles/queue-management-profile:
	  • config/name
	  • wred/uniform/config/min-threshold
	  • wred/uniform/config/max-threshold
	  • wred/uniform/config/enable-ecn
	  • red/uniform/config/min-threshold
	  • red/uniform/config/max-threshold
	  • red/uniform/config/enable-ecn
	These XPaths specifies how packets are ECN marked or dropped for a particular instance of a queue on a particular interface, for example, if RED or WRED is applied to manage the queue's occupancy.
	Model-driven telemetry is supported.

openconfig-aft.yang Version 0.6.0	The Abstract Forwarding Table (AFT) OpenConfig data model is enhanced to support the following features: • The gRPC Network Management Interface (gNMI) proto is revised from version 0.7.0 to 0.8.0 to set the atomic flag to send AFT next-hop group notifications in JSON and PROTO encodings using gNMI subscribe RPC. Network events can be represented as multiple updates in the data models. The atomic flag allows NMS to interpret those multiple updates as a single event. • The nodes next-hop-group/state and next-hops/next-hop defines a list of next-hop addresses and a tunnel type for packets that match the specified criteria. Model-driven telemetry and Event-driven telemetry is supported.

Feature	Description
Cisco-IOS-XR-um-router-isis-cfg.yang	The latest update to the Cisco-IOS-XR-um-router-isis-cfg.yang unified data model includes the addition of the partition-detect and partition-repair containers. These new containers indicate the configuration of the partition-detect and partition-repair nodes.

openconfig-qos.yang Version 0.5.0	The OpenConfig data model defines the configuration to avoid network congestion using queuing mechanism. The updated version of this model enables you to configure the priority schedulers and the queue of packets on the interface using the following XPaths:
	openconfig-qos/
	• scheduler-policies/scheduler-policy/schedulers/scheduler/inputs/input/config/weight: For priority schedulers, this indicates the priority of the corresponding input. Higher values indicate higher priority. For weighted round-robin schedulers, this leaf indicates the weight of the corresponding input.
	• queue-management-profiles/queue-management-profile/:
	  • config/name
	  • wred/uniform/config/min-threshold
	  • wred/uniform/config/max-threshold
	  • wred/uniform/config/enable-ecn
	  • red/uniform/config/min-threshold
	  • red/uniform/config/max-threshold
	  • red/uniform/config/enable-ecn
	These XPaths specifies how packets are ECN marked or dropped for a particular instance of a queue on a particular interface, for example, if RED or WRED is applied to manage the queue's occupancy.
	Model-driven telemetry is supported.

Hardware Introduced

Cisco IOS XR Release 7.10.1 introduces the following hardware support:

Hardware Feature	Description
Cisco 8608 Router	With this release, Cisco introduces another chassis in the Cisco 8000 Series Routers. The Cisco 8608 is a Q200-based, 7-RU router that provides 12.8 Tbps of network bandwidth and supports centralized architecture. The centralized architecture combines the best aspects of distributed and fixed systems. Cisco 8608 has combined the redundancy and I/O diversity of distributed systems with the economics and simple elegance of fixed platforms. As a result, Cisco 8608 delivers redundancy at an optimized cost, enabling flexibility and expandability through generationalcontinuity.

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

Deprecated features

Starting with Cisco IOS XR release 7.10.1, the performance-measurement **{delay-profile | liveness-profile} {sr-policy | endpoint | interface} name** *name* CLI is deprecated. Old configurations stored in NVRAM will be rejected at boot-up. As a result, performance measurement delay and liveness named profiles using the old CLI must be re-configured using the **performance-measurement {delay-profile | liveness-profile} name** *name* CLI.

Note The default performance measurement delay and liveness profiles configured using the **performance-measurement { delay-profile | liveness-profile} { sr-policy | endpoint | interface} default** commands are still valid and unaffected.

For more information, see *CLI Changes for Segment Routing Performance Measurement* section under the *Link Delay Measurement* topic in *Segment Routing Configuration Guide for Cisco 8000 Series Routers, IOS XR Release 7.10.x*.

Release 7.10.1 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                                          7.10.1v1.0.0-1
xr-8000-aib                                            7.10.1v1.0.0-1
xr-8000-bfd                                            7.10.1v1.0.0-1
xr-8000-buffhdr-ea                                     7.10.1v1.0.0-1
```

```
xr-8000-bundles                                  7.10.1v1.0.0-1
xr-8000-card-support                             7.10.1v1.0.0-1
xr-8000-cdp-ea                                   7.10.1v1.0.0-1
xr-8000-cem-driver                               7.10.1v1.0.0-1
xr-8000-cfm                                      7.10.1v1.0.0-1
xr-8000-common-otn                               7.10.1v1.0.0-1
xr-8000-core                                     7.10.1v1.0.0-1
xr-8000-cpa                                      7.10.1v1.0.0-1
xr-8000-cpa-devobj-misc                          7.10.1v1.0.0-1
xr-8000-cpa-npu                                  7.10.1v1.0.0-1
xr-8000-cpa-sb-data                              7.10.1v1.0.0-1
xr-8000-dot1x                                    7.10.1v1.0.0-1
xr-8000-dsm                                      7.10.1v1.0.0-1
xr-8000-encap-id                                 7.10.1v1.0.0-1
xr-8000-ether-ea                                 7.10.1v1.0.0-1
xr-8000-fabric                                   7.10.1v1.0.0-1
xr-8000-feat-mgr                                 7.10.1v1.0.0-1
xr-8000-fib-ea                                   7.10.1v1.0.0-1
xr-8000-forwarder                                7.10.1v1.0.0-1
xr-8000-fpd                                      7.10.1v1.0.0-1
xr-8000-fwd-tools                                7.10.1v1.0.0-1
xr-8000-fwdlib                                   7.10.1v1.0.0-1
xr-8000-gil-ea                                   7.10.1v1.0.0-1
xr-8000-host-core                                7.10.1v1.0.0-1
xr-8000-l2fib                                    7.10.1v1.0.0-1
xr-8000-l2mcast                                  7.10.1v1.0.0-1
xr-8000-leabaofa                                 7.10.1v1.0.0-1
xr-8000-libofaasync                              7.10.1v1.0.0-1
xr-8000-lpts-ea                                  7.10.1v1.0.0-1
xr-8000-mcast                                    7.10.1v1.0.0-1
xr-8000-netflow                                  7.10.1v1.0.0-1
xr-8000-npu                                      7.10.1v1.0.0-1
xr-8000-oam                                      7.10.1v1.0.0-1
xr-8000-optics                                   7.10.1v1.0.0-1
xr-8000-os-oe                                    7.10.1v1.0.0-1
xr-8000-os-oe-extra                              7.10.1v1.0.0-1
xr-8000-pbr                                      7.10.1v1.0.0-1
xr-8000-pd-port-mode                             7.10.1v1.0.0-1
xr-8000-pfilter                                  7.10.1v1.0.0-1
xr-8000-pidb                                     7.10.1v1.0.0-1
xr-8000-pktio                                    7.10.1v1.0.0-1
xr-8000-ple-sdk                                  7.10.1v1.0.0-1
xr-8000-port-mapper                              7.10.1v1.0.0-1
xr-8000-ppinfo                                   7.10.1v1.0.0-1
xr-8000-pwhe-ea                                  7.10.1v1.0.0-1
xr-8000-qos-ea                                   7.10.1v1.0.0-1
xr-8000-span                                     7.10.1v1.0.0-1
xr-8000-spio                                     7.10.1v1.0.0-1
xr-8000-spp-ea                                   7.10.1v1.0.0-1
xr-8000-timing                                   7.10.1v1.0.0-1
xr-8000-tunnel-ip                                7.10.1v1.0.0-1
xr-8000-utapp-blaze                              7.10.1v1.0.0-1
xr-8000-vether                                   7.10.1v1.0.0-1
xr-8000-ztp-ea                                   7.10.1v1.0.0-1
xr-aaa                                           7.10.1v1.0.0-1
xr-acl                                           7.10.1v1.0.0-1
xr-apphosting                                    7.10.1v1.0.0-1
xr-appmgr                                        7.10.1v1.0.0-1
xr-bcdl                                          7.10.1v1.0.0-1
xr-bfd                                           7.10.1v1.0.0-1
xr-bgp                                           7.10.1v1.0.0-1
xr-bgputil                                       7.10.1v1.0.0-1
xr-bng-stubs                                     7.10.1v1.0.0-1
xr-bundles                                       7.10.1v1.0.0-1
```

xr-cal-pi	7.10.1v1.0.0-1
xr-cds	7.10.1v1.0.0-1
xr-cfgmgr	7.10.1v1.0.0-1
xr-cfm	7.10.1v1.0.0-1
xr-cofo	7.10.1v1.0.0-1
xr-core	7.10.1v1.0.0-1
xr-core-calv	7.10.1v1.0.0-1
xr-cpa-common	7.10.1v1.0.0-1
xr-cpa-common-optics	7.10.1v1.0.0-1
xr-cpa-common-psu	7.10.1v1.0.0-1
xr-cpa-driver-devobj-gnss	7.10.1v1.0.0-1
xr-cpa-driver-devobj-misc	7.10.1v1.0.0-1
xr-cpa-driver-devobj-npu	7.10.1v1.0.0-1
xr-cpa-driver-devobj-phy	7.10.1v1.0.0-1
xr-cpa-driver-devobj-sensors	7.10.1v1.0.0-1
xr-cpa-driver-devobj-storage	7.10.1v1.0.0-1
xr-cpa-driver-devobj-test	7.10.1v1.0.0-1
xr-cpa-driver-devobj-timing	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-access	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-common	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-infra	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-kmod-oe	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-misc	7.10.1v1.0.0-1
xr-cpa-driver-fpgalib-optics	7.10.1v1.0.0-1
xr-cpa-driver-optics	7.10.1v1.0.0-1
xr-cpa-ethsw	7.10.1v1.0.0-1
xr-cpa-idprom	7.10.1v1.0.0-1
xr-cpa-tamlib	7.10.1v1.0.0-1
xr-ctc	7.10.1v1.0.0-1
xr-debug	7.10.1v1.0.0-1
xr-dhcp	7.10.1v1.0.0-1
xr-diags	7.10.1v1.0.0-1
xr-diskboot	7.10.1v1.0.0-1
xr-drivers	7.10.1v1.0.0-1
xr-eem	7.10.1v1.0.0-1
xr-elmi-stubs	7.10.1v1.0.0-1
xr-ema	7.10.1v1.0.0-1
xr-enhancedmanageability	7.10.1v1.0.0-1
xr-erp	7.10.1v1.0.0-1
xr-featurecapability	7.10.1v1.0.0-1
xr-fib	7.10.1v1.0.0-1
xr-filesysinv	7.10.1v1.0.0-1
xr-foundation-8000	7.10.1v1.0.0-1
xr-fpd	7.10.1v1.0.0-1
xr-gil	7.10.1v1.0.0-1
xr-ha-infra	7.10.1v1.0.0-1
xr-host-core	7.10.1v1.0.0-1
xr-httpclient	7.10.1v1.0.0-1
xr-icpe-eth	7.10.1v1.0.0-1
xr-icpe-opt	7.10.1v1.0.0-1
xr-identifier	7.10.1v1.0.0-1
xr-infra-sla	7.10.1v1.0.0-1
xr-install	7.10.1v1.0.0-1
xr-ip-apps	7.10.1v1.0.0-1
xr-ip-core	7.10.1v1.0.0-1
xr-ip-infra-vrf	7.10.1v1.0.0-1
xr-ip-mibs	7.10.1v1.0.0-1
xr-ip-static	7.10.1v1.0.0-1
xr-ipc	7.10.1v1.0.0-1
xr-ipsla	7.10.1v1.0.0-1
xr-is-is	7.10.1v1.0.0-1
xr-l2snooptransport	7.10.1v1.0.0-1
xr-l2vpn	7.10.1v1.0.0-1
xr-ldp	7.10.1v1.0.0-1

xr-licensing	7.10.1v1.0.0-1
xr-link-oam	7.10.1v1.0.0-1
xr-linuxnetworking	7.10.1v1.0.0-1
xr-linuxsecurity	7.10.1v1.0.0-1
xr-lldp	7.10.1v1.0.0-1
xr-lpts	7.10.1v1.0.0-1
xr-manageabilityxml	7.10.1v1.0.0-1
xr-mandatory	7.10.1v1.0.0-1
xr-mcast	7.10.1v1.0.0-1
xr-mcastl2snoop	7.10.1v1.0.0-1
xr-mda	7.10.1v1.0.0-1
xr-mpls	7.10.1v1.0.0-1
xr-mpls-oam	7.10.1v1.0.0-1
xr-mpls-oam-client	7.10.1v1.0.0-1
xr-mpls-static	7.10.1v1.0.0-1
xr-netflow	7.10.1v1.0.0-1
xr-networkboot	7.10.1v1.0.0-1
xr-nosi	7.10.1v1.0.0-1
xr-ntp	7.10.1v1.0.0-1
xr-ofa	7.10.1v1.0.0-1
xr-ops-script-repo	7.10.1v1.0.0-1
xr-optics	7.10.1v1.0.0-1
xr-orrspf	7.10.1v1.0.0-1
xr-os-oe-apps	7.10.1v1.0.0-1
xr-os-oe-core	7.10.1v1.0.0-1
xr-os-oe-hardware	7.10.1v1.0.0-1
xr-ospf	7.10.1v1.0.0-1
xr-p4rt	7.10.1v1.0.0-1
xr-perf-meas	7.10.1v1.0.0-1
xr-perfmgmt	7.10.1v1.0.0-1
xr-pfi	7.10.1v1.0.0-1
xr-pird-stubs	7.10.1v1.0.0-1
xr-pkt-trace	7.10.1v1.0.0-1
xr-platforms-ras	7.10.1v1.0.0-1
xr-pm-alarm	7.10.1v1.0.0-1
xr-portmode	7.10.1v1.0.0-1
xr-procmgr	7.10.1v1.0.0-1
xr-python	7.10.1v1.0.0-1
xr-qos	7.10.1v1.0.0-1
xr-rid-mgr	7.10.1v1.0.0-1
xr-routing	7.10.1v1.0.0-1
xr-rpl	7.10.1v1.0.0-1
xr-rsvp-te	7.10.1v1.0.0-1
xr-security	7.10.1v1.0.0-1
xr-security-tams	7.10.1v1.0.0-1
xr-secy-driver	7.10.1v1.0.0-1
xr-servicelayer	7.10.1v1.0.0-1
xr-snmp	7.10.1v1.0.0-1
xr-snmp-hw	7.10.1v1.0.0-1
xr-span	7.10.1v1.0.0-1
xr-spi-core	7.10.1v1.0.0-1
xr-spi-hw	7.10.1v1.0.0-1
xr-spp	7.10.1v1.0.0-1
xr-sr	7.10.1v1.0.0-1
xr-stats	7.10.1v1.0.0-1
xr-stp	7.10.1v1.0.0-1
xr-stubs	7.10.1v1.0.0-1
xr-sysdb	7.10.1v1.0.0-1
xr-syslog	7.10.1v1.0.0-1
xr-telemetry	7.10.1v1.0.0-1
xr-timing	7.10.1v1.0.0-1
xr-tmpdir-cleanup	7.10.1v1.0.0-1
xr-track	7.10.1v1.0.0-1
xr-transports	7.10.1v1.0.0-1

```
xr-tty                                                  7.10.1v1.0.0-1
xr-tunnel-ip                                            7.10.1v1.0.0-1
xr-tunnel-nve                                           7.10.1v1.0.0-1
xr-upgradematrix                                        7.10.1v1.0.0-1
xr-utils                                                7.10.1v1.0.0-1
xr-vether                                               7.10.1v1.0.0-1
xr-vpnmib                                               7.10.1v1.0.0-1
xr-xmlinfra                                             7.10.1v1.0.0-1
xr-xrlibcurl                                            7.10.1v1.0.0-1
xr-ztp                                                  7.10.1v1.0.0-1
```

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
CSCwf89722	EVPN VPWS down post migrating from Multi-homing to Single-Homing.
CSCwf62305	On adding or removing breakout configuration, the npu_drvr crashes.
CSCwf11552	ALARM_CRITICAL: EMON detected heartbeat failure to a card after active route processor reload or failover.
CSCwf81475	Netflow IPv6: The record-ipv6 reports incorrect interfaces with outbundlemember or outphysint options
CSCwf25441	400G ZR link is taking long time to come up on triggering shut/no-shut on fully populated router

Behavior Changes

Starting with Cisco IOS XR Software Release 7.10.1, you must configure a name server for Smart Licensing deployment options that use HTTPS for communication with Cisco Smart Software Manager (CSSM). If the system cannot validate that the Common Name (CN) in the X.509 server certificate is a Fully Qualified Domain Name (FQDN), communication with CSSM results in an **Error during SSL communication**. See the *Smart Licensing Chapter* in the *System Management Configuration Guide for Cisco 8000 Series Routers* for more information and options to bypass the name server configuration.

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 7.10.1 LNT
Copyright (c) 2013-2023 by Cisco Systems, Inc.

Build Information:
Built By      : deenayak
Built On      : Wed Aug 16 23:51:31 UTC 2023
Build Host    : iox-ucs-058
Workspace     : /auto/srcarchive16/prod/7.10.1/8000/ws/
Version       : 7.10.1
Label         : 7.10.1

cisco 8000 (Intel(R) Xeon(R) CPU D-1530 @ 2.40GHz)
cisco 8202-32FH-M (Intel(R) Xeon(R) CPU D-1530 @ 2.40GHz) processor with 64GB of memory
R1 uptime is 8 minutes
Cisco 8200 2RU 32x400G QSFP56-DD w/IOS XR HBM MACsec
```

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
                  ================================================
                                               Req     SW      Min Req   Min Req
Card Type            FPD Description           Reload  Ver     SW Ver  Board Ver
=================== ========================== ====== ======= ======== =========
--------------------------------------------------------------------------------
8102-64H             Bios                        YES     1.13      1.13       0.0
                     BiosGolden                  YES     1.13      1.13       0.0
                     IoFpga                      YES     1.04      1.04       0.0
                     IoFpgaGolden                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     1.88      1.88       0.0
                     x86FpgaGolden               YES     1.88      1.06       0.0
                     x86TamFw                    YES     6.13      6.13       0.0
                     x86TamFwGolden              YES     6.13      6.05       0.0
--------------------------------------------------------------------------------
8102-64H-O           Bios                        YES     0.241     0.241      0.0
                     BiosGolden                  YES     0.241     0.241      0.0
                     IoFpga                      YES     1.04      1.04       0.0
                     IoFpgaGolden                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     1.88      1.88       0.0
                     x86FpgaGolden               YES     1.88      1.06       0.0
                     x86TamFw                    YES     6.13      6.13       0.0
```

```
                    x86TamFwGolden             YES      6.13       6.05       0.0
--------------------------------------------------------------------------------
PSU650W-ACPE        LI-SecMCU                  NO       2.55       2.55       0.0
--------------------------------------------------------------------------------
PSU650W-ACPI        LI-SecMCU                  NO       2.54       2.54       0.0
--------------------------------------------------------------------------------
PSU930W-DCPE        LI-SecMCU                  NO       2.03       2.03       0.0
--------------------------------------------------------------------------------
PSU930W-DCPI        LI-SecMCU                  NO       3.03       3.03       0.0
```

Cisco 8200 Series Router

```
RP/0/RP0/CPU0# show fpd package
===============================================================================
                         Field Programmable Device Package
                    ================================================
                                          Req      SW       Min Req    Min Req
 sdIntelS4510             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       0.0
                    x86FpgaGolden              YES      1.06       0.48       0.0
                    x86TamFw                   YES      5.13       5.13       0.0
                    x86TamFwGolden             YES      5.13       5.05       0.0
--------------------------------------------------------------------------------
8201-ON             Bios                       YES      1.208      1.208      0.0
                    BiosGolden                 YES      1.208      1.207      0.0
                    IoFpga                     YES      1.11       1.11       0.1
                    IoFpgaGolden               YES      1.11       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      1.06       1.06       0.0
                    x86FpgaGolden              YES      1.06       0.48       0.0
                    x86TamFw                   YES      5.13       5.13       0.0
                    x86TamFwGolden             YES      5.13       5.05       0.0
--------------------------------------------------------------------------------
8201-SYS            Bios                       YES      1.29       1.29       0.0
                    BiosGolden                 YES      1.29       1.15       0.0
                    IoFpga                     YES      1.11       1.11       0.1
                    IoFpgaGolden               YES      1.11       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      1.06       1.06       0.0
                    x86FpgaGolden              YES      1.06       0.48       0.0
                    x86TamFw                   YES      5.13       5.13       0.0
                    x86TamFwGolden             YES      5.13       5.05       0.0
--------------------------------------------------------------------------------
8201-SYS-ON         Bios                       YES      1.208      1.208      0.0
                    BiosGolden                 YES      1.208      1.207      0.0
                    IoFpga                     YES      1.11       1.11       0.1
                    IoFpgaGolden               YES      1.11       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      1.06       1.06       0.0
                    x86FpgaGolden              YES      1.06       0.48       0.0
                    x86TamFw                   YES      5.13       5.13       0.0
                    x86TamFwGolden             YES      5.13       5.05       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      1.03      1.03      0.0
                     PO-SecMCU                 NO      1.06      1.06      0.0
-------------------------------------------------------------------------------
PSU2KW-ACPI          PO-PrimMCU                NO      1.03      1.03      0.0
                     PO-SecMCU                 NO      1.08      1.08      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      1.09      1.09      0.0
                     PO-SecMCU                 NO      1.10      1.10      0.0
```

Cisco 8600 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
==================== ==================== ======= ======= ======== =========
--------------------------------------------------------------------------------
86-3.2KW-AC          EM-LogicMCU          NO      0.10      0.10      0.0
                     EM-PrimMCU           NO      0.02      0.02      0.0
                     EM-SecMCU            NO      0.02      0.02      0.0
--------------------------------------------------------------------------------
86-3.2KW-DC          EM-LogicMCU          NO      0.11      0.11      0.0
                     EM-PrimMCU           NO      0.04      0.04      0.0
                     EM-SecMCU            NO      0.04      0.04      0.0
--------------------------------------------------------------------------------
86-MPA-14H2FH-M      IoFpga               YES     1.02      1.02      0.1
                     IoFpgaGolden         NO      1.02      1.00      0.1
--------------------------------------------------------------------------------
86-MPA-24Z-M         IoFpga               YES     1.02      1.02      0.1
                     IoFpgaGolden         NO      1.02      1.00      0.1
--------------------------------------------------------------------------------
86-MPA-4FH-M         IoFpga               YES     1.02      1.02      0.1
                     IoFpgaGolden         NO      1.02      1.00      0.1
--------------------------------------------------------------------------------
8608-FS[FB]          IoFpga               NO      1.10      1.10      0.2
                     IoFpgaGolden         NO      1.10      1.00      0.2
--------------------------------------------------------------------------------
8608-RP              Bios                 YES     1.09      1.09      0.0
                     BiosGolden           YES     1.09      1.01      0.0
                     IoFpga               YES     1.09      1.09      0.0
                     IoFpgaGolden         NO      1.09      1.01      0.0
                     SsdMicron7300M2      YES     2.60      2.60      0.0
                     SsdMicron7450M2      YES    11.00     11.00      0.0
                     x86Fpga              YES     1.07      1.07      0.0
                     x86FpgaGolden        YES     1.07      1.07      0.0
                     x86TamFw             YES     7.12      7.12      0.0
                     x86TamFwGolden       YES     7.12      7.12      0.0
--------------------------------------------------------------------------------
8608-SC0-128         IoFpga               YES     1.01      1.01      0.0
                     IoFpgaGolden         YES     1.01      1.01      0.0
--------------------------------------------------------------------------------
8608-SC0-128[FB]     IoFpga               NO      1.10      1.10      0.2
```

```
                     IoFpgaGolden              NO      1.10      1.00      0.2
-------------------------------------------------------------------------------
PSU4.3KW-HVPI        DT-LogicMCU               NO      8.04      1.04      0.0
                     DT-PrimMCU                NO      8.02      1.02      0.0
                     DT-SecMCU                 NO      8.02      1.02      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     1.12      1.12      0.0
                     BiosGolden           YES     1.12      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.09      1.09      0.1
                     IoFpgaGolden         YES     1.09      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     0.91      0.91      0.1
                     x86FpgaGolden        YES     0.91      0.78      0.1
                     x86TamFw             YES     6.13      6.13      0.1
                     x86TamFwGolden       YES     6.13      6.10      0.1
--------------------------------------------------------------------------------
88-LC0-34H14FH-O     Bios                 YES     0.241     0.241     0.0
                     BiosGolden           YES     0.241     0.241     0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.09      1.09      0.1
                     IoFpgaGolden         YES     1.09      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     0.91      0.91      0.1
                     x86FpgaGolden        YES     0.91      0.78      0.1
                     x86TamFw             YES     6.13      6.13      0.1
                     x86TamFwGolden       YES     6.13      6.10      0.1
--------------------------------------------------------------------------------
88-LC0-36FH          Bios                 YES     1.12      1.12      0.0
                     BiosGolden           YES     1.12      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
                     EthSwitchGolden      YES     1.04      0.07      0.0
                     IoFpga               YES     1.13      1.13      0.1
                     IoFpgaGolden         YES     1.13      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     1.40      1.40      0.1
                     x86FpgaGolden        YES     1.40      1.04      0.1
                     x86TamFw             YES     6.16      6.16      0.1
                     x86TamFwGolden       YES     6.16      6.05      0.1
--------------------------------------------------------------------------------
88-LC0-36FH-M        Bios                 YES     1.12      1.12      0.0
                     BiosGolden           YES     1.12      0.13      0.0
                     EthSwitch            YES     1.04      1.04      0.0
```

```
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.13      1.13      0.1
                    IoFpgaGolden              YES     1.13      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     1.40      1.40      0.1
                    x86FpgaGolden             YES     1.40      1.04      0.1
                    x86TamFw                  YES     6.16      6.16      0.1
                    x86TamFwGolden            YES     6.16      6.05      0.1
--------------------------------------------------------------------------------
88-LC0-36FH-MO      Bios                      YES     0.241     0.241     0.0
                    BiosGolden                YES     0.241     0.241     0.0
                    EthSwitch                 YES     1.04      1.04      0.0
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.13      1.13      0.1
                    IoFpgaGolden              YES     1.13      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     1.40      1.40      0.1
                    x86FpgaGolden             YES     1.40      1.04      0.1
                    x86TamFw                  YES     6.16      6.16      0.1
                    x86TamFwGolden            YES     6.16      6.05      0.1
--------------------------------------------------------------------------------
88-LC0-36FH-O       Bios                      YES     0.241     0.241     0.0
                    BiosGolden                YES     0.241     0.241     0.0
                    EthSwitch                 YES     1.04      1.04      0.0
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.13      1.13      0.1
                    IoFpgaGolden              YES     1.13      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     1.40      1.40      0.1
                    x86FpgaGolden             YES     1.40      1.04      0.1
                    x86TamFw                  YES     6.16      6.16      0.1
                    x86TamFwGolden            YES     6.16      6.05      0.1
--------------------------------------------------------------------------------
88-LC1-12TH24FH-E   Bios                      YES     1.09      1.09      0.41
                    BiosGolden                YES     1.09      1.01      0.41
                    EthSwitch                 YES     1.04      1.04      0.0
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.00      1.00      0.0
                    IoFpgaGolden              YES     1.00      1.00      0.0
                    SsdMicron7300M2           YES     2.60      2.60      0.0
                    SsdMicron7450M2           YES    11.00     11.00      0.0
                    x86Fpga                   YES     1.00      1.00      0.31
                    x86FpgaGolden             YES     1.00      1.00      0.31
                    x86TamFw                  YES     7.13      7.13      0.31
                    x86TamFwGolden            YES     7.13      7.13      0.31
--------------------------------------------------------------------------------
8800-LC-36FH        Bios                      YES     1.29      1.29      0.0
                    BiosGolden                YES     1.29      1.15      0.0
                    EthSwitch                 YES     1.04      1.04      0.0
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.38      1.38      0.0
                    IoFpgaGolden              YES     1.38      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     1.53      1.53      0.0
                    x86FpgaGolden             YES     1.53      0.33      0.0
                    x86TamFw                  YES     5.14      5.14      0.0
                    x86TamFwGolden            YES     5.14      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     1.38      1.38      0.0
                    IoFpgaGolden              YES     1.38      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     1.53      1.53      0.0
                    x86FpgaGolden             YES     1.53      0.33      0.0
                    x86TamFw                  YES     5.14      5.14      0.0
                    x86TamFwGolden            YES     5.14      5.05      0.0
--------------------------------------------------------------------------------
8800-LC-48H         Bios                      YES     1.29      1.29      0.0
                    BiosGolden                YES     1.29      1.15      0.0
                    EthSwitch                 YES     1.04      1.04      0.0
                    EthSwitchGolden           YES     1.04      0.07      0.0
                    IoFpga                    YES     1.38      1.38      0.0
                    IoFpgaGolden              YES     1.38      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     1.53      1.53      0.0
                    x86FpgaGolden             YES     1.53      0.33      0.0
                    x86TamFw                  YES     5.14      5.14      0.0
                    x86TamFwGolden            YES     5.14      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     1.38      1.38      0.0
                    IoFpgaGolden              YES     1.38      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     1.53      1.53      0.0
                    x86FpgaGolden             YES     1.53      0.33      0.0
                    x86TamFw                  YES     5.14      5.14      0.0
                    x86TamFwGolden            YES     5.14      5.05      0.0
--------------------------------------------------------------------------------
8800-RP             Bios                      YES     1.29      1.29      0.0
                    BiosGolden                YES     1.29      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     1.35      1.35      0.0
                    x86FpgaGolden             YES     1.35      0.24      0.0
                    x86TamFw                  YES     5.14      5.14      0.0
```

	x86TamFwGolden	YES	5.14	5.05	0.0
8800-RP-E	Bios	YES	1.29	1.29	0.0
	BiosGolden	YES	1.29	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	1.35	1.35	0.0
	x86FpgaGolden	YES	1.35	0.24	0.0
	x86TamFw	YES	5.14	5.14	0.0
	x86TamFwGolden	YES	5.14	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	1.35	1.35	0.0
	x86FpgaGolden	YES	1.35	0.24	0.0
	x86TamFw	YES	5.14	5.14	0.0
	x86TamFwGolden	YES	5.14	5.05	0.0
8800-RP2	Bios	YES	1.09	1.09	0.3
	BiosGolden	YES	1.09	1.07	0.3
	EthSwitch	YES	1.02	1.02	0.0
	EthSwitchGolden	YES	1.02	0.07	0.0
	SsdMicron7300M2	YES	2.60	2.60	0.0
	SsdMicron7450M2	YES	11.00	11.00	0.0
	TimingFpga	YES	1.00	1.00	0.0
	TimingFpgaGolden	YES	1.00	1.00	0.0
	x86Fpga	YES	1.01	1.01	0.3
	x86FpgaGolden	YES	1.01	1.00	0.3
	x86TamFw	YES	7.13	7.13	0.3
	x86TamFwGolden	YES	7.13	7.13	0.3
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-FAN-V1	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-FAN-V1         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
                    PO-SecMCU                 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.

- A kernel upgrade on Cisco 8000 Series Routers has introduced some Cisco IOS XR Release 7.10.1-specific upgrade and downgrade caveats. For details, see Release 7.10.1 Caveats.

Supported Transceiver Modules

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

Production Software Maintenance Updates (SMUs)

A production SMU is a SMU that is formally requested, developed, tested, and released. Production SMUs are intended for use in a live network environment and are formally supported by the Cisco TAC and the relevant development teams. Software bugs identified through software recommendations or Bug Search Tools are not a basis for production SMU requests.

For information on production SMU types, refer the Production SMU Types section of the *IOS XR Software Maintenance Updates (SMUs)* guide.

Supported Transceiver Modules

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

Cisco IOS XR Error messages

To view, search, compare, and download Cisco IOS XR Error Messages, refer to the Cisco IOS XR Error messages tool.

Cisco IOS XR MIBs

To determine the MIBs supported by platform and release, refer to the Cisco IOS XR MIBs 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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